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SEXUAL VICTIMIZATION HISTORY AND VISUAL ATTENTIONAL BIAS FOR EMOTIONAL PICTURES IN COLLEGE WOMEN

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by

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Various traumatic experiences and post-traumatic stress disorder (PTSD) are associated with biased attention toward trauma-related information. However, few studies have exclusively investigated such biases in sexual victimization survivors or identified factors that influence this relationship between sexual victimization and biased attention. Using eyetracking methodology, the current study attempts to delineate attentional patterns in sexually victimized and non-victimized undergraduate women, using viewing of different emotional picture pairs. This study also aims to assess the impact of PTSD symptomatology on the relationship between sexual victimization and greater attentional bias. Finally, the study explores changes in attention toward trauma-related stimuli among survivors by examining whether the probability of fixation for the trauma-related (rape) picture varies as a function of time and victimization history over the duration of a trial. A total of 142 undergraduate women who reported sexual victimization history viewed trauma-related, negative, and positive picture pairs for 5 seconds while their eye movements were recorded. No evidence was found for attentional biases toward trauma-related pictures in survivors with or without PTSD symptoms. However, survivors higher in PTSD symptoms demonstrated a tendency to dwell less on positive pictures than those lower in PTSD symptoms. Further, sexual victimization did not predict changes in fixations on

trauma-related stimuli over the course of trial duration. Implications of these results are discussed in relation to methodological advantages of using eyetracking to assess attentional biases, and potential targets of intervention for survivors with higher PTSD symptomatology.

Dedication

To my mother, for always believing in me and praying for me. Also, to my clients, for inspiring me to just keep moving forward.

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Chapter 1: Introduction

Exposure to unwanted sexual experience during childhood or adolescence (herein referred to as CSA) as well as in adulthood (herein referred to as ASA) is unfortunately common. However, survivors respond to similar experiences in remarkably diverse ways, thus underscoring the need for detection of resilience and risk factors that can alter the trajectory of recovery. An emergent body of research suggests that sexual victimization may be associated with biases in survivors' attention to trauma-related emotional information (e.g., Fani, Bradley-Davino, Ressler, & McClure-Tone, 2010; Pineles, Shipherd, Mostoufi, Abramovitz, & Yovel, 2009). Understanding these biases has relevance for survivors given that attention is an important and precursory component of emotion regulation (Gross, 1998; Wadlinger & Isaacowitz, 2008), a pivotal process that underlies negative psychological sequelae following sexual victimization experience (Walsh, 2009). Little empirical research, however, has examined the specific nature and degree of attentional biases among sexual victimization survivors. Even less is known about factors that may create and maintain such biases in survivors.

A number of recent studies suggest that post-traumatic stress disorder (PTSD) symptomatology may constitute one explanatory mechanism that exerts influence over trauma survivors' attentional deployment in response to salient emotional stimuli. Indeed, a substantial line of research within the anxiety literature has linked PTSD and attentional biases in survivors of various types of trauma (for reviews, see Aupperle, Melrose, Stein, & Paulus, 2011; Vasterling & Brailey, 2005; Williams, Watts, MacLeod, & Mathews, 1997). For example, studies have

documented that patients with PTSD symptoms display attentional bias toward trauma-related stimuli subsequent to their trauma experience (Bryant & Harvey, 1995; Foa, Feske, Murdock, Kozak, & McCarthy, 1991; McNally, Kaspi, Riemann, & Zeitlin, 1990). Theoretical support for this finding comes from emotion processing theory of PTSD (Foa & Kozak, 1985, 1986) that conceptualizes attentional bias to trauma-related stimuli as a significant factor in the development and maintenance of PTSD following trauma exposure. Pursuant to such findings, a novel program of research has evolved that investigates attentional bias modification as a treatment for anxiety disorders, including PTSD, based on the assumptions that higher levels of symptoms may be associated with greater attentional biases to salient emotional stimuli and modifying these biases may effectively reduce pathological symptoms in patients (for a review, see Bar-Haim, 2010).

Despite findings that sexually victimized individuals have one of the highest rates of lifetime PTSD (Breslau, Kessler, Chilcoat, Schultz, Davis, & Andreski, 1998), much of the research within the PTSD literature have examined attentional biases in the context of traumas other than sexual victimization, such as combat exposure. Nevertheless, it is likely that PTSD severity and symptom presentation vary by the type of traumatic event endured (Kelley, Weathers, McDevitt-Murphy, Eakin, & Flood, 2009) and may differentially influence trauma survivors' attention and require different treatment approaches. Thus, it is important to examine the unique impact of PTSD symptomatology on sexual victimization survivors' emotional attentional processing.

The present study therefore investigates attentional biases to emotional stimuli in a sample of undergraduate women reporting sexual victimization experiences. This study extends prior work by comparing women reporting a history of sexual victimization versus no sexual victimization to determine whether such a history is associated with unique visual attentional biases in response to pairs of trauma-related (i.e., depicting sexual victimization) and non-trauma (i.e., positive and general negative) pictures. This study also aims to determine whether sexual victimization is related to attentional biases in the context of PTSD symptomatology or whether these biases are solely a consequence of sexual victimization experience alone. This investigation therefore examines the association between PTSD symptoms and attentional biases in sexually victimized women, by assessing whether greater attentional bias was associated with higher levels of PTSD symptomatology (i.e., total symptom severity and distinct PTSD symptom clusters) among survivors. Finally, the study also assesses whether participants show changes in fixations on trauma-related stimuli over the course of trial duration that may be indicative of participants' manipulation of their attention, perhaps as a way to regulate their emotions. Finally, this study also examines whether sexual victimization history predicts these changes in fixations across trial duration.

To provide a framework for the present study, relevant theoretical perspectives and available empirical evidence that suggest predictions regarding the associations of visual attentional biases with sexual victimization are first summarized. Additionally, this section integrates available findings regarding the role of PTSD symptomatology in survivors' attentional biases. The second section summarizes gaps in the current

literature to provide support for the proposed associations in the current study. The final section provides specific aims and hypotheses for the present study.

Sexual Victimization and Attentional Biases to Emotional Information

Sexual victimization experiences are all too common. Data from studies using nationally representative samples suggest that approximately 6% of children report sexual abuse within the previous year (Briere & Elliot, 2003; Finkelhor, Turner, Ormrod, & Hamby, 2009) and approximately 22% of adult women report sexual victimization experiences after eighteen years of age (Elliot, Mok, & Briere, 2004). A multitude of deleterious psychological and behavioral outcomes may arise from these experiences, which include, but are not limited to, PTSD, depression, substance abuse, self-destructive behaviors, and sexual revictimization (e.g., Elliot et al.; Maker, Kemmelmeier, & Peterson, 2001; Paolucci, Genuis, Violato, 2001; Putnam, 2003; Tyler, 2002). The effects are, in general, more harmful when one experiences revictimization (i.e., multiple experiences of sexual victimization occurring in childhood and adulthood), indicating that the effects of sexual victimization may be cumulative (Messman-Moore, Long, & Siegfried, 2000). However, extensive work in this area suggests that survivors vary in their adjustment following sexual victimization. In fact, some do not develop any negative outcomes and may resume their functioning naturally (Molnar, Buka, Kessler, 2001). For instance, Wright, Fopma-Loy, and Fischer (2005) found that female CSA survivors showed considerable discrepancies in how adequately they functioned across intrapersonal, interpersonal, and intrafamilial domains, and approximately 82% of the women in their study evidenced positive adaptation in at least one domain of functioning.

Therefore, identifying factors that explain this diverse and complex clinical picture in survivors following sexual victimization is of critical importance.

As noted, one such explanatory mechanism that may have relevance to sexual victimization comprises *attentional bias to emotional information*. In humans, attention acts as the gateway to several important cognitive processes such as memory and learning that form the necessary building blocks to subsequent successful functioning and development (Shechner et al., 2012). Indeed, because of limited cognitive resources, attention provides a way for dedicated perceptual processing by prioritizing the multitude of environmental in order to focus on those most relevant in the moment. For instance, attention can be captured involuntarily so that it alerts cognition to important events in the environment. Furthermore, attention provides a way for cognition to control perception and emotions by strategically switching focus from one stimulus to another (Hill, 1999). With traumatic experiences such as sexual victimization, certain emotional stimuli, particularly those related to the trauma, tend to hold high salience to survivors, thereby demanding greater attention and available cognitive capacities. While this may facilitate survival in the face of real danger, in the absence of actual danger, selective attention to trauma-related stimuli may disrupt and bias survivors' attentional deployment. In addition to preferentially attending to trauma-related stimuli to the exclusion of all other information (including corrective information), survivors may also experience difficulties inhibiting responses to and disengaging from trauma-related stimuli (Aupperle et al., 2011).

Theoretical writings within the child and adult literatures elucidate how these attentional biases develop in sexual victimization survivors. For example, Pollak's

(2003) *experience-dependent affective learning* model illustrates the contribution of childhood victimization to biased attentional processing of emotional information. According to this theory, children are biologically prepared for attending to and learning about emotions from salient events in their environment. However, they possess limited processing capacities due to maturational constraints on their sensory and perceptual systems, which therefore necessitate selective filtering of information they attend to or process from their environment. As a result, victimized children may selectively attend to and process relevant aspects of external information that are central to their aversive experiences. In particular, they may be more prone to attend to emotional cues that resemble their victimization experiences and suggest threat or harm. These biased attentional patterns, in turn, may make child survivors less effective at processing victimization-related threat cues, noticing other important cues, and shifting attention to positive cues to manage their distress (Pollak). Although Pollak's model is based on ongoing research with physically abused children, many of the same processes suggested may be applicable to children with experiences of CSA.

Emotion processing theories further illuminate how attentional biases evolve following traumatic events like sexual victimization. For example, Foa and Kozak's (1985, 1986) *emotion processing theory* proposes that, subsequent to trauma exposure, survivors develop adaptive or maladaptive *fear structures* with representations unique to their trauma experiences, including the fear-invoking situation, their responses in the situation, and subjective meaning of the situation and responses. Although normal or adaptive fear structures include realistic and accurate perceptions of threat that then generate appropriate physiological and behavioral responses, pathological or

maladaptive fear structures emerge when one's perceptions of threat and responses are faulty (i.e., in the absence of an actual danger) or exaggerated (Foa, Huppert, & Cahill, 2006). Because of personal relevance, survivors readily attend to a wide range of trauma-related stimuli in the environment, some of which may accurately signal danger while others represent safe situations or visual stimuli that vaguely resemble the original trauma. When survivors' maladaptive fear structures are triggered by these stimuli, they may experience increased physiological arousal and fail to utilize accurate information from prior learning or consider the context of perceived threat. Consequently, survivors may engage in faulty appraisals of even safe cues as dangerous and respond in accordance with their fear (Foa & Kozak, 1986). Specifically, attentional biases to trauma-related stimuli may become maladaptive when survivors excessively and solely attend to such stimuli, experience lack of flexibility using attention, and eventually resort to maladaptive behaviors such as avoidance or numbing in their effort to cope with their negative emotions (Foa et al., 2006). Survivors with significant posttraumatic distress may therefore display greater disruptions in attention to triggers of trauma. These attentional biases, when repeated, may become habitual pathological ways of processing trauma-related information and result in several psychological problems.

Extensive research on attentional biases among individuals with anxiety disorders, including PTSD, provides clues to possible attentional biases (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van Ijzendoorn, 2007; Mogg & Bradley, 1998; Pollak, 2003). For instance, individuals with anxiety symptoms have demonstrated a tendency to initially selectively attend to emotionally-salient stimuli

and subsequently exhibit lack of flexibility using attention when processing such stimuli within their environment. Specifically, three forms of biases have been identified in anxious individuals: (a) faster detection of or orientation toward threatening stimuli (*facilitated attention*); (b) prolonged engagement with or difficulties shifting attention from threatening stimuli (*delayed disengagement*), and; (c) allocation of attention toward locations opposite to the locations of threatening stimuli (*attentional avoidance*) (for a review, see Cisler & Koster, 2010). These findings further suggest that there may be differences in the expression of attentional biases across different stages of information processing. Specifically, anxious individuals may display facilitated attention and initial engagement at early stages of visual processing, which is followed by delayed disengagement and attentional avoidance in later, mostly strategic processing stages (Cisler & Koster; Mogg, Bradley, de Bono, & Painter, 1997).

Although these attentional biases are observed among survivors of various traumas, few studies have explored whether sexual victimization survivors manifest unique attentional patterns. Nevertheless, this is an important question to be answered, given that the ability to regulate attention toward salient emotional information may have significant consequences for sexual victimization survivors' adaptive functioning. Over the past decade, a number of studies have identified these biases in emotional attentional deployment as a proximal process that is involved in the onset and maintenance of psychopathologies such as anxiety and depression (e.g., Aupperle et al., 2011; Browning, Holmes, & Harmer, 2010). Attentional biases may constitute an underlying risk factor for emotional disorders through its negative effects on the

succeeding process of emotion regulation. Under ordinary circumstances, attentional deployment is an important preliminary component of emotion regulation (Gross, 1998) whereby people modulate their attention in a given situation to alter their emotional states (Gross & Thompson, 2007). This process of emotion regulation, however, is disrupted in many sexual victimization survivors (Marx, Heidt, & Gold, 2005; Messman-Moore, Walsh, & DiLillo, 2010; Shields & Cicchetti, 1998, 2001; Shipman & Zeman, 2001; Walsh, DiLillo, & Scalora, 2011). While people typically exert considerable control over their abilities to focus and flexibly shift attention in order to manage their emotions over time (MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002; Rueda, Posner, & Rothbart, 2004), these attentional processes may become biased as a result of sexual victimization experiences and compromise survivors' emotional responses to reminders of their trauma (Shipman & Zeman, 2001; Williams, Mathews, & MacLeod, 1996). For instance, sexually victimized individuals may preferentially attend to trauma-related stimuli and subsequently have trouble disengaging from such stimuli (Foa et al., 2006). These attentional patterns may increase the likelihood that they ruminate on such experiences, appraise these stimuli as much more threatening, and fail to use effective coping strategies, all of which consequently escalate their negative emotions (Derryberry & Reed, 2002) and produce or exacerbate negative psychological sequelae. One of the psychological outcomes after sexual victimization that has been investigated most is PTSD. As will be discussed below, the different attentional biases may closely parallel the symptoms of PTSD and play a role in the maintenance of the disorder.

PTSD Symptoms as a Predictor of Attentional Biases in Sexual Victimization Survivors

PTSD is one of the most prevalent psychological problems associated with sexual victimization (Kendall-Tackett et al., 1993; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Molnar et al., 2001; Surís, Lind, Kashner, Borman, & Petty, 2004). According to the *Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition, Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000)[1], PTSD encompasses several cognitive, emotional, and behavioral symptoms following exposure to a wide range of stressors, including any event that satisfies Criterion A definition of a trauma, that lead to impaired functioning in at least one important life domain. Survivors may report varying levels of the following clusters of symptoms: (a) persistent re-experiencing of the traumatic event (Criterion B); (b) recurrent avoidance of trauma-related stimuli and emotional numbing (Criterion C); and (c) persistent hyperarousal symptoms (Criterion D).

Maladaptive attentional patterns to salient emotional cues are also at the core of PTSD (Ehlers & Clark, 2000; Vasterling, Brailey, Constans, & Sutker, 1998). Building on the concepts from emotion processing theory and incorporating neuropsychological empirical evidence, Aupperle et al. (2011) proposed a model to explicate how attentional biases to trauma-related information may contribute to and maintain the clinical symptom presentation of PTSD. According to these authors, following a traumatic event, trauma-related stimuli become highly salient and demand

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[1] The fifth edition of the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-5) was not published at the time of data collection.

greater attentional resources from most, if not all, survivors, which may be revealed as increased attention toward trauma-related stimuli (i.e., selective or facilitated attention). However, Aupperle et al.'s model suggests that, due to subtle impairments in executive functioning, some of these survivors may experience difficulties inhibiting automatic responses and disengaging attention from trauma-related stimuli. That is, these individuals may fail to determine whether an environmental stimulus (in particular, trauma-related stimulus) is irrelevant or distracting to their current goals and fail to disengage from it to orient toward goal-relevant stimuli. These difficulties in disengaging from trauma-related stimuli, in turn, may be evidenced as pervasive symptoms of hyperarousal, hypervigilance, irritability, intrusive memories, difficulty concentrating, and diminished interest in activities. When their attempts to inhibit or disengage from trauma-related stimuli fail, they may alternatively, but ineffectively, resort to avoiding attention to any emotional triggers (Aupperle et al.). Persistent avoidance of traumatic reminders may reduce survivors' experience of rewarding aspects of life and contribute to emotional numbness and depressive symptoms (Foa & Kozak, 1986). In essence, Aupperle et al. summarize that the different attentional biases of facilitated attention, difficulty with disengagement, and attentional avoidance may be specifically related to the different symptom clusters of PTSD, thereby contributing to the development and maintenance of PTSD.

A substantial empirical literature has linked attentional bias to PTSD symptomatology (for reviews, see Aupperle et al., 2011; Bryant & Harvey, 1995; Buckley, Blanchard, & Neill, 2000; Shipherd & Salters-Pedneault, 2008). However, the majority of this empirical evidence has evolved from studies of population

exposed to traumas such as combat and motor vehicle accidents (e.g., Bryant & Harvey; Kimble, Fleming, Bandy, Kim, & Zambetti, 2010). Few studies have examined whether the presence of PTSD symptoms matter for emotional attentional biases among sexual victimization survivors using strong methodologies. The following section provides an overview of the existing empirical support for the association between sexual victimization and attentional biases to salient, trauma-related stimuli, and these findings additionally highlight the need for exploration of PTSD symptoms as a factor that might predict attentional biases among sexual victimization survivors.

Empirical Support for Visual Attentional Biases in Sexual Victimization Survivors

Visual attentional biases in childhood victimization survivors. There is mounting empirical evidence derived from studies among children and adults with varied childhood victimization histories, including CSA, that have linked attentional biases .with traumas such as early sexual victimization and PTSD symptoms may predict the observed disruptions in attentional deployment.

In a study of sexually victimized girls (aged 11-17 years) with and without a current diagnosis of PTSD, Freeman and Beck (2000) assessed participants' attentional biases using a Stroop task (Stroop, 1935). The Stroop task was modified to include words related to sexual trauma (e.g., kissing), developmentally relevant words (e.g., shame), general threat words (e.g., cancer), positive words (e.g., enjoy), and neutral words (e.g., sofa) as stimuli, each of which was presented for 1500 milliseconds (ms). Attentional bias on the Stroop task was inferred from cognitive

interference when participants showed longer response latencies (i.e., greater interference) to color-naming trauma-related words than other words, a pattern supposedly due to automatic activation of trauma-related semantic and affective representations (Weber, 2008) or fear structures. Results indicated that survivors with a PTSD diagnosis were slower in color naming all words regardless of content, as compared to the non-victimized and nonclinical control group, indicating that survivors with PTSD showed cognitive interference for all words (and not only trauma-related words). Survivors without a PTSD diagnosis, however, did not differ from either the PTSD group or control group. Further, both survivors and non-victimized control participants exhibited longer response latencies in color naming trauma-related words (i.e., greater attentional interference) compared to other word types. The authors attributed this unexpected finding to the "tabooed" nature of trauma-related words (e.g., penis) and to the potential emotional relevance of sexuality for adolescents that may have primed all adolescents in the study to think about sexual trauma-related words. These findings imply that attentional processing patterns in sexually victimized adolescent girls with PTSD may not be necessarily trauma-related and that other cognitive processing deficits may prevail in this population as noted by their delayed overall color naming.

Other studies using a similar methodology, however, have found that sexual victimization survivors with PTSD exhibit unique attentional patterns to trauma-related stimuli. For example, in a more recent study using a modified Stroop task, including trauma-related words, intimacy words, and neutral words, Martinson, Sigmon, Craner, Rothstein, and McGillicuddy (2013) found that men and women with

a history of sexual victimization in childhood and/or adulthood, particularly those with a current diagnosis of PTSD, displayed longer color naming latencies for trauma-related and intimacy words compared to survivors without PTSD and non-victimized control group (following an unspecified time of stimulus presentation). Thus, emotionally-salient word stimuli influenced attentional processing in survivors with PTSD. However, survivors without PTSD did not differ from the non-victimized control group, suggesting that presence of PTSD may be crucial for attentional processing of emotional material rather than a sexual victimization history alone.

While these studies provide initial evidence for attentional biases in sexual victimization survivors, particularly for those with current PTSD, there are limitations of this work due to the methodology used. Specifically, doubts have been raised about findings using the modified Stroop task given that it provides ambiguous evidence for attentional bias to trauma-related words at best (Williams, Mathews, & MacLeod, 1996). For example, investigators have observed similar degree of interference not only for trauma-related words, but also for affectively different words such as positive words (e.g., McNally, Riemann, Louro, Lukach, & Kim, 1992). Moreover, there is no consensus about interpreting the Stroop interference in that longer color naming latencies to trauma-related words in survivors can be interpreted not only as facilitated attention to these words but also as delayed responding to these words (Cisler & Koster, 2010). Furthermore, factors other than facilitated attention may affect performance on Stroop task such as anxiety elicited by the words or rumination over word meaning, but these cannot be delineated using this method (Cisler & Koster).

The visual dot-probe (MacLeod, Mathews, & Tata, 1986) is another paradigm that attempts to overcome some of the problems with the modified Stroop task. Unlike the Stroop task, the dot-probe is a more direct measure of attentional bias that does not rely on interference on a secondary task (e.g., color naming) to measure biases in attentional deployment and instead allows for examination of direction of these biases (i.e., toward or away from threat). In this task, participants are shown pairs of emotional stimuli, and each pair is followed by a probe (e.g., an asterisk) that replaced the location of one of the stimulus in the pair. Participants are then instructed to press a button to indicate which of the two stimuli in the pair was replaced by the probe. Attention bias scores were calculated by subtracting the mean reaction time on trials where the probe replaced the location of an emotional stimulus (valid trials) from trials where the probe replaced the location of a neutral stimulus (invalid trials), with positive bias scores implying selective attention to emotional stimulus and negative scores implying attentional avoidance of emotional stimulus. Thus, dot-probe allows for assessment of spatial attentional allocation by examining the impact of emotional stimuli on the relative probe-detection latencies in two spatial areas (Cisler & Koster, 2010).

Using this paradigm, Pine and colleagues (2005) studied attentional biases in male and female children (aged 7-13 years) with sexual abuse, physical abuse, and/or neglect experiences. Participants saw photographs of happy, angry, and neutral face pairs for 500 ms followed by an asterisk that replaced the location of one of the faces in the pair. These researchers found that, compared to non-victimized children and children with minimal history of physical abuse, severely physically abused children

showed an attentional bias such that they tended to avoid angry faces. Physically abused children did not show any attentional bias to happy faces. Further, greater severity of physical abuse and a current PTSD diagnosis were each associated with increased attentional avoidance of angry faces. However, because those with greater abuse (physical/sexual/neglect) severity also had higher rates of PTSD, the degree to which attentional bias relates to abuse severity (independent of PTSD) as opposed to PTSD, remains unclear. A major limitation of this study is that data analysis did not take into consideration that many of the physically abused children in the sample also experienced other victimization experiences such as severe sexual abuse and neglect. Therefore, the conclusions that can be drawn from these findings are limited regarding whether and how each type of victimization uniquely contributes to attentional biases to relevant emotional information.

Two studies of adult survivors of childhood victimization utilized the dot-probe method as well. Gibb, Schofield, and Coles (2009) examined attentional biases among undergraduate men and women with and without exposure to moderate to severe levels of sexual, physical, and/or emotional abuse in childhood. Participants viewed photographs of emotional (angry, sad, and happy) and neutral face pairs, with each emotional-neutral pair presented for 1000 ms. Contrary to Pine et al.'s finding, participants who reported a history of victimization, including CSA, displayed selective attention toward angry, but not happy or sad faces. Further, abused individuals exhibited a nonsignificant trend toward attentional avoidance of happy faces (p = .08), suggesting that early victimization may also be related to biased processing of other emotional stimuli in adulthood. Although both Pine et al. (2005)

and Gibb et al. utilized similar methodology to assess attentional bias, both differed on the presentation time of stimuli (500 ms vs. 1000 ms), which may mean that conclusions were drawn based on the type of attentional bias that was evident at the time of stimulus presentation. They also differed on sample characteristics such as the type(s) of abuse endured and developmental age of participants at the time of the study (children vs. adults), both of which may have relevance for emotional attentional processing (Pollak, Cicchetti, Hornung, & Reed, 2000). Furthermore, both studies did not adequately control for participants' PTSD symptoms, a matter that precludes conclusive statements on the unique contribution of early victimization to attentional biases.

Fani and colleagues (2010) extended Gibb et al.'s findings in a primarily African American sample consisting of men and women with or without a history of childhood victimization (sexual, physical, and/or emotional abuse) from a community sample. Survivors' PTSD symptoms were also assessed. Participants viewed photographs of emotional (threatening or happy) and neutral face pairs in addition to neutral face pairs for 500 ms each. Interestingly, all victimization types were significantly associated with attentional bias toward happy faces, but not threatening or neutral faces. This finding held true even after controlling for the effects of different adult traumatic incidents, suggesting the unique association between early victimization experiences such as CSA and subsequent attentional biases in adulthood. Finally, attentional bias toward happy faces was independently associated with childhood victimization and PTSD symptoms of numbing and avoidance in adulthood

and there were no mediational relationships between these factors as the authors predicted.

Although these visual dot-probe studies offer some evidence linking childhood victimization experiences, including CSA, to unique attentional patterns to (i.e., attention toward or away from) different emotional information, like the Stroop task, the dot-probe method also has limitations. For example, this task does not adequately distinguish whether faster responses on valid trials (i.e., when the probe appears in the same location as the angry face) are a result of facilitated attention to angry faces, or difficulties switching attention away from (or prolonged engagement on) the angry face even after it disappeared (Bar-Haim et al., 2007). Further, similar to the Stroop, the dot-probe provides only information about attentional biases at one point in time and does not capture the pattern of attentional allocation over time (Hermans, Vansteenwegen, & Eelen, 1999). These methods present only a snapshot view of attentional bias depending on the presentation time of the stimuli, which does not allow assessment of the different attentional patterns across an entire stimulus trial.

In another study among physically abused, primarily African American, children (aged 8-11 years), Pollak and Tolley-Schell (2003) used a different method—a spatial cueing task (Fox, Russo, & Dutton, 2002)—to assess attentional biases. In the cueing task, participants were presented with photographs of an emotional (happy or angry faces) or neutral cue in one of the two rectangles for 500 ms followed by display of a neutral target stimulus (e.g., star) in the same (valid trials) or opposite (invalid trials) location where the cue had appeared. Participants then indicated the rectangle in which the target appeared by pressing a key. Faster responses for the target in valid

trials where the cue draws attention to the rectangle with the target stimuli reflect increased attention (i.e., facilitated attention) to cued stimuli and slower responses to invalid trials where the cue draws attention away from the target-rectangle imply prolonged attentional engagement on cued stimuli. Findings indicated that physical abuse severity predicted faster orientation toward and prolonged processing of angry faces (i.e., delayed disengagement), but not happy faces.

Other studies indicate that victimized children also show heightened sensitivity to and faster detection of visual stimuli eliciting other negative emotions such as fear (e.g., Masten et al., 2008). Using a morphed facial emotion identification paradigm with happy, neutral, and fearful faces in children with different victimization experiences (physical abuse, sexual abuse, emotional abuse, neglect, and/or exposure to domestic violence), Masten and colleagues found that, compared to non-victimized children, victimized children more quickly identified emotional facial expressions, particularly fearful faces. Three-fourths of the victimized children had a definite or probable PTSD diagnosis. Although insufficient power may have precluded detection of differences, an exploratory analysis between maltreated children with and without PTSD indicated that children with severe maltreatment experiences in general exhibited faster detection of fearful faces and the presence of PTSD diagnosis did not affect this finding.

Summary and critique. The empirical evidence on the topic of childhood victimization and visual attentional biases is rather mixed. Results of the aforementioned studies suggest that many individuals with experiences of childhood victimization such as CSA do show an attentional bias toward threatening stimuli

(Gibb et al., 2009), but others show a bias away from threatening stimuli (Pine et al., 2005), and still others show a bias toward positive stimuli (Fani et al., 2010). The two studies that investigated attentional biases among early sexual victimization survivors (Freeman & Beck, 2000; Martinson et al., 2013) yielded mixed findings as well, such that while adolescent female survivors with PTSD did not exhibit increased Stroop interference for trauma-related words, adult male and female survivors with PTSD displayed increased Stroop interference such stimuli, compared to survivors without PTSD and nonvictims.

One major question arising from these studies concerns the nature of attentional bias. Specifically, it is unclear whether survivors manifest biased attention exclusively for threatening trauma-related information, or if it is directed also toward other affectively different information such as positive stimuli in their environment. Moreover, there is lack of clarity regarding the direction of attentional bias for (i.e., toward or away from) different types of emotional information. Methodological differences may explain the divergence in these findings. For example, these studies use differing methodologies (e.g., Stroop, dot-probe, and spatial cueing). Moreover, regardless of the methods employed, none can adequately delineate the different types of attentional biases; in fact, some methods used are of questionable validity in assessing attentional bias (e.g., modified Stroop task). Prior work also differed in the threatening stimuli used (e.g., trauma-related words, angry faces, fear faces) and in the duration of stimulus presentation, which limits drawing general conclusions. Further, many of these studies combined different victimization types (e.g., sexual abuse, physical abuse, emotional abuse, and neglect), and did not delineate unique effects of

different victimization types on attentional biases. They also did not accordingly choose trauma-specific stimuli that are potentially perceived as threatening by different survivors. Participant diversity in terms of ethnicity, gender, and developmental age of survivor at the time of the study (i.e., adolescents versus adults), was also noted across studies. In some studies among adult survivors of childhood victimization (e.g., Gibb et al., 2009; Martinson et al., 2013), the presence and effect of adulthood victimization were not considered. Finally, there is little consensus about the effect of PTSD, with some studies showing greater attentional biases among survivors with PTSD (Martinson et al.; Pine et al., 2005), but some showing no differences among survivors with regard to their PTSD (Freeman & Beck, 2000; Masten et al., 2008), and yet others who did not assess for PTSD (Gibb et al.).

In summary, these data do not directly provide answers regarding the relation between early exposure to sexual victimization and emotional attentional biases, and the effect of survivors' PTSD symptoms on their attentional deployment for salient emotional information. However, they raise several important questions and areas of exploration regarding the relation between CSA, PTSD symptomatology, and attentional biases for future research, some of which will be examined in the current study.

Visual attentional biases in adult sexual victimization survivors. Not only are sexual victimization experiences prevalent in childhood, they are also common in adulthood, and a few studies have explored attentional bias among survivors of adult sexual victimization (ASA; occurring after eighteen years of age). Foa and colleagues (1991) used a modified Stroop task to investigate attentional biases among adult

female sexual victimization survivors with and without PTSD diagnosis and non-victimized control participants. The stimuli included trauma-related threat words, general threat words, neutral/fruit words, and non-words, each presented for 1000 ms. Rape survivors with PTSD showed longer response latencies to color name trauma-related threat words than other words, whereas the comparison groups (including rape survivors without PTSD) did not show Stroop interference for any word types. Foa et al. concluded that attentional biases reflected in Stroop interference to trauma-related threat words were typical of survivors' PTSD psychopathology rather than mere exposure to sexual victimization.

Comparable results were obtained in a study of mostly adult female sexual victimization survivors with and without PTSD as well as non-victimized control participants who completed a modified Stroop task for high threat (i.e., trauma-related), moderate threat (e.g., "crime"), positive (e.g., "loyal"), and neutral (e.g., "typical") words, each presented for 1500 ms (Cassiday, McNally, & Zeitlin, 1992). Similar to Foa et al. (1991), these researchers found that survivors with PTSD showed longer response latencies to color name all word types, with greatest interference observed for high threat or trauma-related threat words, followed by moderate threat, positive, and neutral words, in that order. Unlike Foa et al.'s findings, survivors who did not have a current diagnosis of PTSD also exhibited Stroop interference for trauma-related threat words, albeit to a lesser extent than what those with PTSD showed. This study also found that survivors' interference for trauma-related threat words was associated with self-reported symptoms of intrusive symptoms but not avoidance or numbing symptoms on the Impact of Events Scale. The authors posited

that greater interference among survivors without PTSD compared to controls resulted from the presence of high levels of anxiety (fear of negative evaluation), depression, and avoidance or psychic numbing symptoms in the rape-only group. They also suggested that this finding might have resulted from the fact that most of the rape-only survivors had a past diagnosis of PTSD but had not received effective treatment (and as a result may continue to experience PTSD symptoms), whereas Foa et al.'s study used recovered rape survivors for their rape-only group. Together, Cassiday et al. summarized that survivors with PTSD show biased attention to all emotional words, but particularly to trauma-related threat words, and survivors without a PTSD diagnosis showed similar interference, but to a lesser extent than those with current PTSD did.

In a recent study, Pineles et al. (2009) used a visual search paradigm in which female sexual victimization survivors with high and low PTSD symptoms were instructed to identify a discrepant target amongst an array of identical stimuli. Participants were classified into the two PTSD groups based on their responses to PTSD Checklist (Weathers, Litz, Herman, Huska, & Keane, 1993) anchored to an unwanted sexual experience that bothered them the most at the time of assessment. The stimuli in the visual search task included trauma-related words (e.g., "rape"), general threat words (e.g., "anxiety"), semantically related neutral words (fruits), and uncategorized neutral words (e.g., "cotton"), and non-words. Although high PTSD survivors did not evidence selective attention to trauma-related words, they demonstrated greater difficulties disengaging their attention specifically from trauma-related words, which interfered with their performance on visual search task.

Conversely, survivors low in PTSD did not show any difference in responding to trials with trauma-related words compared to trials with other word types. Because the PTSD symptoms were assessed in relation to the most bothersome sexual experience, it is not known in which participants the symptoms were related to CSA, ASA, or both. Importantly, the lack of a non-victimized control group precludes any definitive conclusions to be drawn regarding the impact of ASA and PTSD on attentional biases.

Summary and critique. Although relatively few studies have explored attentional biases among ASA survivors, findings from the existing work do suggest that sexual victimization in adulthood predicts biased attentional processing toward trauma-related stimuli. Moreover, this link appears to be more pronounced in survivors with high PTSD symptoms or a PTSD diagnosis. However, there are methodological differences across these studies. For instance, all three studies differed in the attentional task used to capture the biases. While the two studies (Cassiday et al., 1992; Foa et al., 1991) that utilized Stroop task do not assist with clarifying the nature of attentional bias observed among ASA participants, Pineles et al.'s study (2010) using a visual search task provides preliminary evidence that attentional biases in sexual victimization survivors may be characterized by difficulty disengaging from trauma-related stimuli rather than facilitated attention to such stimuli. However, these studies did not assess for CSA among ASA survivors, raising the critical question regarding the cumulative impact of sexual victimization in childhood and adulthood on attentional biases in adulthood. Data from this work, however, suggest that exposure to ASA as well as high PTSD symptom levels may be related to the differences in the exhibition of attentional bias. Considering the therapeutic and

research implications of this conclusion, the present study attempts to explore these relations using an advanced methodology.

Visual attentional biases and revictimization. In the one study to date that examined the cumulative impact of CSA and ASA on emotional attentional biases, Field and colleagues (2001) administered the modified Stroop color-naming task to treatment-seeking women recruited from the community with one of the two different victimization histories—those with only CSA experiences and CSA survivors who had been sexually revictimized during six months prior to the beginning of the study—and a DSM-IV diagnosis of PTSD. Participants viewed a fixed order presentation of neutral words (fruits), general threat words (e.g., "coffin"), and trauma-related words (e.g., "rape") in addition to a control card of cluster of X's. CSA-only women with PTSD had longer response latencies in color-naming trauma-related threat words than other words. Further, compared to the CSA-only PTSD group, revictimized PTSD group showed longer color-naming latencies for trauma-related words. This greater attentional bias in the revictimized PTSD group may have resulted from revictimization functioning as a prime in activating preexisting trauma fear structures formed from early sexual abuse experiences in women with PTSD (Foa et al., 1991). Survivors with multiple sexual victimization experiences may also possess more elaborate and tightly knit fear structures related to their victimization experiences than do survivors with victimization experiences in either childhood or adulthood (Foa et al.).

Although consistent with prior findings that individuals respond with greater emotional distress to sexual victimization in adulthood if they also had an experience

of CSA than when they do not (Follette, Polusny, Bechtle, & Naugle, 1996; Nishith, Mechanic, & Resick, 2000), absence of CSA without PTSD group, ASA only group, and nonabused group as comparisons limits the inferences drawn from this study. Nevertheless, this study highlights the importance of examining the joint effects of sexual victimization experiences in childhood and adulthood on subsequent attentional bias to emotional information. This finding regarding cumulative impact of sexual victimization on emotional attentional bias is important considering higher rates of sexual revictimization among individuals with a history of sexual victimization (Roodman & Clum, 2001). Furthermore, studies have found that multiple experiences of sexual victimization are linked to increased risk for the development of PTSD (Nishith et al.). Thus, it seems likely that revictimized survivors, who may also have greater levels of PTSD symptoms, will display greater attentional biases as compared to singly victimized survivors (i.e., either in childhood or adulthood). However, this remains to be tested.

Gaps in the Current Literature

The above review provides initial evidence for associations between sexual victimization, visual attentional bias, and PTSD; however, the findings are less consistent and there are several gaps that require further inquiry.

First, few studies have focused exclusively on sexual victimization survivors. Indeed, several of the above-mentioned studies included survivors with multiple forms of victimization and did not distinguish between the different types or examine their unique relations with attentional deployment. Given the probability that survivors differ in the processing of emotional cues depending on their specific victimization

experiences (Pollak et al., 2000), possibly due to differences in the activation of fear structures or schemas from their trauma, it is essential that future work also assess unique effects of sexual victimization on biased attentional processing of emotional information.

Second, the differential contributions of single sexual victimization (in either childhood/adolescence or adulthood) and revictimization to later attentional biases are not clear. In particular, studies among adult survivors of CSA have often failed to account for ASA experiences. Likewise, studies of ASA survivors have not determined whether the observed attentional biases resulted only from ASA or were perhaps also influenced by CSA that was not assessed, which would be an indication of the cumulative impact of revictimization. Moreover, only one study (Field et al., 2001) has examined the cumulative impact of sexual victimization on attentional bias. Furthermore, given the important role attentional processes play in revictimization such as greater deficits in recognition of danger cues observed in revictimized women (Messman-Moore & Brown, 2006), it is important that future studies examine differences between survivors with single victimization experiences and revictimization.

Third, studies among survivors with childhood victimization experiences including CSA provide support for facilitated attention to angry and happy stimuli, delayed disengagement from angry stimuli, and attentional avoidance of angry and happy stimuli, at different durations of stimulus presentation on different tasks. On the other hand, one study (Pineles et al., 2009) of ASA survivors revealed delayed disengagement from trauma-related stimuli but not facilitated attention to the same

stimuli. More work using stronger methodology is needed to resolve discrepancies in the existing literature regarding the nature of attentional biases and identify attentional biases that pertain uniquely to sexual victimization survivors. Further, there is some indication with anxious individuals that different aspects of attentional bias are evidenced at different stages of processing emotional information, with heightened vigilance observed immediately after stimulus presentation, delayed disengagement thereafter, and avoidance of salient cues during longer durations (Cisler & Koster, 2010). Thus, examining whether attention varies as a function of time from the onset of stimulus presentation is important and provides a complete view of different aspects relevant to victimization survivors.

In addition to the lack of clarity regarding the nature of attentional bias in sexual victimization survivors, existing data do not provide a consistent picture regarding whether survivors exhibit attentional bias toward trauma-related stimuli in particular or to emotional stimuli more generally. Although some findings indicate that attentional bias pertains to trauma-related stimuli more than general negative stimuli in trauma survivors with PTSD (McNally, 1998; Pineles et al., 2009), others theorize that trauma survivors show biases in attention to a wide array of threatening stimuli, including safer negative stimuli along with trauma-related stimuli that suggest danger (Foa & Kozak, 1986). Moreover, some studies have noted that survivors show biased attention to positive stimuli as well (Fani et al., 2010). Future investigation is needed to understand the different components of attentional bias, biases to different emotional stimuli, and whether attention varies over time during stimulus presentation.

Next, previous analyses of the association between PTSD and attentional biases in survivors have yielded mixed findings. While some studies conclude that a PTSD diagnosis or high PTSD symptom level underlies exaggerated attentional biases demonstrated by childhood and adulthood victimization survivors, others found that greater victimization severity is sufficient to predict attentional biases. However, it is possible that survivors with severe or multiple victimization experiences are more likely to evidence greater PTSD symptomatology and attentional biases. Thus, it remains to be fully understood whether the effect of sexual victimization on attention to emotional visual stimuli is dependent on the levels of survivors' current PTSD symptomatology in order to understand if these attentional biases are unique to PTSD or if these are simply a consequence of sexual victimization experience. Regardless, a larger consensus in the empirical and theoretical literature is that attentional biases to salient emotional stimuli are related to the severity of PTSD symptoms (Aupperle et al., 2011; Bryant & Harvey, 1995). It is likely that deficits in attentional deployment that emerge following exposure to severe victimization experiences such as facilitated attention, delayed disengagement, and attentional avoidance may contribute to and sustain symptoms of hypervigilance, re-experiencing, and avoidance coping, which are considered hallmark of PTSD. Further research is needed to determine whether maladaptive attentional deployment in sexual victimization survivors is dependent on the levels of their current PTSD symptomatology.

Moreover, several of the existing studies have focused on a comparison of survivors with and without a current PTSD diagnosis. In recent years, there has been growing recognition that studies examining the effects of trauma only on survivors

who meet the diagnostic criteria for a PTSD diagnosis may obscure meaningful differences across the full range of PTSD symptom presentation. This perspective emphasizes that PTSD is a dimensional entity with different stress-related symptom patterns experienced on a continuum rather than a discrete clinical syndrome (Ruscio, Ruscio, & Keane, 2002), which highlights a need to consider levels of PTSD symptom severity and symptom cluster differences in survivors rather than presence or absence of PTSD diagnosis. This is even more important considering some empirical evidence that the different components of attentional bias may be implicated by different PTSD symptoms. For example, hypervigilance and hyperarousal symptoms may be related to faster initial orientation or facilitated attention to trauma-related stimuli whereas intrusive symptoms or rumination may be related to delayed disengagement from trauma-related stimuli (Pineles et al., 2009). Other researchers have found that facilitated attention to trauma-related stimuli is also related to intrusive symptoms (Cassiday et al., 1992), whereas facilitated attention to happy stimuli is related to avoidance and numbing symptoms (Fani et al., 2010). Thus, future research needs to examine associations between specific PTSD symptom clusters and attentional biases.

Finally, as noted, differences in methods used to assess attentional bias may account for some of the discrepant results. Many commonly used paradigms, such as the Stroop task, do not adequately distinguish the different patterns of attentional bias such as facilitated attention to, delayed disengagement from, and avoidance of trauma-related stimuli. Furthermore, these paradigms provide only assessment at one time point after stimulus presentation rather than assess the time course of attentional process during the presentation of stimuli. Moreover, several of these paradigms draw

indirect inferences about attentional bias based on another unrelated task performance (e.g., color naming, identify location of cue, or find the odd stimulus out), which also hinders natural viewing of the stimuli. Further, there is little comparison across stimuli used to assess attentional processing in participants. The majority of the studies have utilized lexically based methods (i.e., words) and emotional faces rather than more ecologically relevant stimuli such as pictures of emotional scenes that may offer direct insight into the processing of visual information. The present study examines associations between sexual victimization, attentional bias, and PTSD using an observational, eyetracking methodology that addresses some of the limitations of the existing literature. In particular, eyetracking directly captures different aspects of attentional bias to ecologically salient stimuli and allows for a time course evaluation of eye movements over a period of time.

Purpose of the Present Study

Based on the overview of empirical literature relevant to attentional bias and PTSD in sexual victimization survivors, the present study is intended to address some of the major gaps and limitations in the literature. The study will utilize a natural viewing paradigm, an eyetracker that offers a direct, non-invasive assessment of hypervigilance and avoidance behavior without reliance on inferences from reaction time tasks or performance on a secondary task regarding facilitation or interference. By assessing overt gaze fixation patterns, fixation durations, and shifts in eye movements, this method allows for a continuous index of overt attention allocation to emotionally-salient or non-salient stimuli (Nummenmaa, Hyönä, & Calvo, 2006) that reflects the variation in the nature of attentional bias at different stages of processing

of emotional stimuli (Calvo & Avero, 2005). Although a few studies have employed this technology among trauma survivors (e.g., motor vehicle accident survivors in Bryant, Harvey, Gordon, & Barry, 1995; Iraqi war veterans in Kimble et al., 2010), it appears that no studies have utilized this approach in studying attentional biases in sexual victimization survivors. Specifically, the present study compares attentional biases in women who are non-victimized, singly victimized or non-revictimized, and revictimized when presented with pairs of trauma-related (i.e., rape), general negative and positive pictures on the eyetracker. The study also explores whether the nature of attentional bias varies as a function of time from the onset of stimulus presentation that would provide a complete view of attentional patterns relevant to sexual victimization survivors when confronted with emotional information. Finally, the current study assesses the role of PTSD symptomatology (i.e., total PTSD symptoms as well as three clusters of PTSD symptoms) in the relationship between sexual victimization and greater attentional bias. The results of this study may improve current understanding of emotional attentional bias in sexual victimization survivors, while also advancing efforts aimed at prevention and intervention of PTSD.

Specific Aims and Corresponding Hypotheses

The specific aims and corresponding hypotheses of this study are to:

Aim 1. Examine the associations between sexual victimization and visual attentional biases in the processing of trauma-related stimuli (i.e., rape pictures).

Hypothesis 1a. Women who have experienced sexual revictimization will quickly **fix their first gaze** on rape pictures when paired with positive or negative pictures than will women with single victimization experience or no victimization.

***Hypothesis 1b*.** Women who have experienced sexual revictimization will **dwell longer the first time** they look at rape pictures when paired with positive or negative pictures than will women with single victimization experience or no victimization.

***Hypothesis 1c*.** Women who have experienced sexual revictimization will **dwell longer** on rape pictures when paired with positive or negative pictures than will women with single victimization experience or no victimization.

***Hypothesis 1d*.** Women who have experienced sexual revictimization will make **more revisits** to rape pictures when paired with positive or negative pictures than will women with single victimization experience or no victimization.

Aim 2. Examine whether PTSD symptomatology predicts attentional processing of trauma-related stimuli (i.e., rape pictures) in sexually victimized women.

***Hypothesis 2a*.** Sexually victimized women higher in PTSD symptoms will quickly **fix their first gaze** on rape pictures when paired with positive or negative pictures than will victimized women lower in PTSD symptoms.

***Hypothesis 2b*.** Sexually victimized women higher in PTSD symptoms will **dwell longer the first time** they look at rape pictures when paired with positive or negative pictures than will victimized women lower in PTSD symptoms.

***Hypothesis 2c*.** Sexually victimized women higher in PTSD symptoms will **dwell longer** on rape pictures when paired with positive or negative pictures than will victimized women lower in PTSD symptoms.

***Hypothesis 2d*.** Sexually victimized women higher in PTSD symptoms will make **more revisits** to rape pictures when paired with positive or negative pictures than will victimized women lower in PTSD symptoms.

Aim 3. Examine whether sexual victimization predict variations in fixation patterns for the trauma stimulus (i.e., rape picture) of the pair of stimuli across trial duration.

***Hypothesis 3*.** All women, regardless of their victimization history, will initially display similar likelihood to fixate on the rape picture. However, women who have experienced sexual revictimization will display progressively less fixations on the rape picture of the pair of stimuli across trial duration than will women with single victimization experience or no victimization. On the other hand, women with single victimization experience and no victimization will display faster decline in fixations on the rape picture across trial duration than will women with revictimization experience.

Finally, for the purposes of the larger study, participants were randomly assigned to a negative or neutral mood induction prior to completing the eyetracking task. Therefore, we explored the effects of negative mood on participants' attentional bias to different emotional stimuli. Exploratory analyses also assessed for the presence of interactions between induced mood, sexual victimization history, and attentional bias variables, which may confound the main effects that the study was designed to assess. Ample evidence suggests the link between increased negative emotional state and greater biased attentional processing of negative stimuli among anxious and depressed people (e.g., Bar-Haim et al., 2007; Frewen, Dozois, Joanisse, & Neufeld,

2008) as well as nonclinical samples (Becker & Leinenger, 2011). Mood-congruent attentional bias for positive stimuli has also been noted among nonclinical samples, with positive mood induction increasing their attention to positive information, particularly highly-valenced positive stimuli (Tamir & Robinson, 2007; Wadlinger & Isaacowitz, 2006). These findings suggest that one's current emotional state can actually alter aspects of one's conscious experience such as attentional deployment. Similar findings were observed in a study that investigated this proposition among physically abused male and female children where participants who experienced higher levels of maltreatment showed preferential attention to sad stimuli only after they experienced a sad emotional state (Romens & Pollak, 2012). Indeed, maltreatment experiences such as sexual victimization may influence physiological reactivity to emotional states (Pine, 2003; Romens & Pollak), which in turn alters attentional processing of emotional information (Roelofs, Bakvis, Hermans, van Pelt, & van Honk, 2007). These findings could imply that women with sexual revictimization experiences may display greater attentional biases to highly-negative and salient trauma-related stimuli while in a negative emotional state, compared to women with single victimization experience and no victimization. However, hypotheses concerning the impact of mood condition on emotional attentional biases are not specified in the current study and related analyses are exploratory in nature given that there are no studies to date that have examined the influence of temporary emotional state on attentional biases in sexually victimized individuals.

Chapter 2: Method

Participants

The sample for the current study included 142 undergraduate women attending the University of Nebraska—Lincoln who participated in a larger investigation exploring emotions, cognitions, and early life experiences. Twelve participants from the larger study were excluded from the analyses because of missing data for all primary variables of the current study. Participants were predominantly European-American (n = 121; 85%); however, 6% (n = 8) were Asian/Asian American, 4% (n = 6) were Hispanic/Latino, 3.5% (n = 5) were African American, 1% (n = 1) was Middle Eastern, and 1% (n = 1) was of unknown ethnicity. The average age for participants was 20.9 years (SD = 3.34; range = 19-42), with an average socioeconomic background within the middle- to upper-middle-class range. Although most participants (88%, n = 125) had never been married, 4% (n = 6) were married, 7% (n = 10) were cohabitating with a partner, and 1% (n = 1) was divorced.

Measures

Four primary classes of variables were analyzed for the purposes of this study: (1) victimization variables (childhood/adolescence sexual victimization and adult sexual victimization), (2) *in vivo* attentional bias variables assessed using eyetracker, (3) survivors' current PTSD symptoms, and (4) mood manipulation.

Victimization Measures

Childhood sexual victimization. Two retrospective self-report questionnaires were used to maximize detection of sexual abuse experiences prior to age 18. Participants completed the sexual abuse subscale of the Childhood Trauma

Questionnaire (CTQ; Bernstein et al., 2003), which is comprised of five items specifically designed to assess the frequency of sexual abuse experiences while growing up (e.g., "When I was growing up, someone tried to touch me in a sexual way, or tried to make me touch them"). Each item on the CTQ is rated on a five-point Likert scale, anchored from 1 (*never true*) to 5 (*very often true*), and asks about experiences before the age of 18. A sum of all responses represents a severity score ranging from 5 to 25, with higher scores representing more severe sexual abuse in childhood. Participants were classified as victims and nonvictims based on a recommended cutoff score derived from Receiver Operator Characteristic analyses with those scoring six or greater considered as victims and those scoring five considered nonvictims (Bernstein & Fink, 1998). Several studies have shown good reliability and validity of scores on this measure in both clinical and community populations (e.g., Bernstein et al., 1994; Bernstein et al., 2003) as well as within an undergraduate population (Paivio & Cramer, 2004). Additionally, the CTQ indices significantly correlate with other measures of child maltreatment (e.g., the Childhood Trauma Interview; Bernstein et al., 1994). Alpha was .92 for the sexual abuse subscale in the present study.

Participants also completed the sexual abuse subscale of the Computer Assisted Maltreatment Inventory (CAMI; DiLillo et al., 2010), a comprehensive self-report measure that screens and assesses sexual abuse experiences occurring prior to age 18. This instrument presents respondents with a list of sexual experiences varying in severity (e.g., kissing, fondling or sexual touching, oral, anal, or vaginal intercourse) and respondents are asked to indicate whether they experienced any of these either (a) with a family member or an individual who was at least five years older before the age of

14; or (b) against their will, involved force, or occurred with someone at least 10 years older if the incident(s) occurred between ages 14 and 17. However, the CAMI instructs the participants to exclude voluntary sexual play with a similar age peer, voluntary sexual activities with a dating partner, and non-contact forms of sexual abuse such as exhibitionism as sexually abusive behavior. In contrast to the Likert-type items on the CTQ, the CAMI employs three behaviorally specific screener questions any of which, if answered affirmatively, would be followed by more detailed questions about various dimensions of each victimization experience (e.g., nature, frequency, duration and severity of the abuse, age at the time of abuse, relationship to the perpetrator, use of force, and number of perpetrators involved) as well as reactions related to specific victimization experiences (e.g., emotions, disclosure, and social support; DiLillo et al., 2006). In the current study, participants who responded positively to one or more of the screener items were considered potential victims of CSA. The sexual abuse subscale has a test-retest coefficient of .71 and has shown high rate of agreement in abuse status with concurrent measures of child sexual maltreatment such as the sexual abuse subscale of the CTQ (percentage agreement = 92.5%; DiLillo et al., 2006).

Research supports the utility of administering both these measures rather than either one alone in identifying survivors of CSA. DiLillo and colleagues (2006) found that the sexual abuse subscale of CTQ was more sensitive in detecting less severe sexual abuse experiences than the CAMI sexual abuse subscale, whereas the behaviorally specific CAMI captured all explicit instances of sexual abuse, some of which were not captured by the CTQ. Therefore, the CTQ was used in conjunction

with the CAMI to identify survivors of CSA. Participants in this study were classified as victims of CSA if they endorsed victimization on either the CTQ or CAMI.

Adult sexual victimization. Adult sexual victimization (since age 18) was assessed using the Modified Sexual Experiences Survey (MSES; Messman-Moore & Brown, 2004), an expanded version of the Sexual Experiences Survey (SES; Koss & Gidycz, 1985). The MSES consists of eighteen items assessing three types of unwanted sexual acts, including sexual contact (e.g., kissing, fondling), oral-genital contact, and vaginal or anal penetration. For each type of unwanted sexual contact, participants were asked about different perpetrator tactics: methods of coercion (continual arguments or pressure and misuse of authority) or force (physical force and alcohol or drug intoxication). Participants who endorsed one or more of the sexual victimization experiences occurring during or after the age of 18 were considered survivors of adult sexual victimization. The original SES is a psychometrically valid measure that has an internal consistency coefficient of .74 and a 1-week test-retest coefficient of .93 (Koss & Gidycz). Alpha for the MSES in the current study was .82.

For the current study, participants' sexual victimization status was comprised of three groups: non-victimized, non-revictimized or singly victimized (i.e., sexual victimization in childhood/adolescence or adulthood), and revictimized (i.e., sexual victimization experiences in childhood/adolescence and adulthood).

Attentional Bias

Split-screen task. Participants were presented with 40 slides on a computer screen, with each slide portraying two pictures: one on the right side of the slide and one on the left slide (see Appendix C for sample stimuli). Each of the 40 trials

comprised one of the following pairs: (a) one negative picture and one positive picture (*n* = 18 pairs), (b) one positive picture and one sexual victimization picture (*n* = 4 pairs), (c) one negative picture and one sexual victimization (herein referred to as "rape") picture (*n* = 6 pairs), (d) two positive pictures (*n* = 6 pairs), or (e) two negative pictures (*n* = 6 pairs). The analyses in the current study only included pairs of affectively different pictures (i.e., rape-positive, rape-negative, and positive-negative pictures). The positive (e.g., flower, newlyweds) and negative (e.g., tombstone, a man holding a woman at gunpoint) pictures were drawn primarily from the International Affective Pictures System (IAPS; Lang, Bradley, & Cuthbert, 1997). The IAPS pictures have been normatively matched for emotional valence and arousal (Lang et al.). Efforts were made to match all pictures on themes (e.g., both pictures may be interpersonal or inanimate), number of people, overall complexity, and image quality. The pictures types on each slide were counterbalanced by side. In addition, slides were randomly presented to each participant. Each slide was presented for a total of 5000 ms with an inter-trial interval of 500 ms. At the beginning of each trial, a fixation point appeared in the middle of the screen and participants were instructed to look directly at it and to press the spacebar to initiate the trial. In each trial, slide presentation was followed by a picture-rating task asking participants to rate "how they felt about the just viewed picture" on a scale of 1 (*very negative*) to 9 (*very positive*).

Eyetracker apparatus. An eyetracker apparatus was utilized to monitor participants' eye gaze fixations and movements during picture presentation. Specifically, the study utilized the SR Research Ltd. EyeLink II system, a second

generation, video-based eyetracking system that captures natural gaze shifts in both eyes over a long period upon presentation of stimuli competing for attentional resources. The apparatus includes three small cameras mounted on a headband that the participant wears; one camera is directed at each eye and the third camera tracks information about the environment. Seventeen-point validation and calibration accuracy tests were initially performed to minimize error. Calibration was repeated if any point was in error by more than 1° or if the average error for all points was greater than 0.5°. On occasions when the eyetracker is unable to track both eyes, one eye was chosen for tracking, such as is done in Kimble et al. (2010). For the purposes of the present study, visual attention indices, including first fixation time, first run dwell time, overall dwell time, and run count, were analyzed using the eyetracker method to draw conclusions regarding visual attentional biases in sexually victimized women. A description of these indices is provided in Table 1.

PTSD Symptoms

The PTSD Checklist-Civilian Version (PCL-C; Weathers et al., 1993) is a 17-item self-report measure designed to assess presence and severity of PTSD symptomatology, including re-experiencing, avoidance, and arousal symptoms, as described in the DSM-IV-TR (e.g., "How much have you been bothered by repeated, disturbing memories, thoughts, or images of a stressful experience from the past in the last month?"). Participants were asked to rate the severity of their symptoms during the previous month using a five-point Likert scale ranging from 1 (*not at all*) to 5 (*extremely*). The summed score across all responses served as an indicator of total PTSD symptoms, with higher scores indicating greater levels of symptomatology. Separate summed

scores for three PTSD clusters were also created for the analyses. The PCL-C has internal consistency ranging from .89 to .97 and test-retest reliability of .96 (Weathers et al.), and correlates highly with interview-based measures of PTSD (r = .93; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). Alpha for the PCL-C in the current study was .95.

Mood Manipulation

Mood induction. Participants were randomly assigned to a negative or neutral mood condition prior to the eyetracking task as part of the larger study, which involved watching a 4.5-minute film clip to induce either a negative or mildly pleasant emotional state. This is built on the empirical findings that people deliberately choose to focus on positive stimuli to counteract negative moods and those who, alternatively, selectively attend toward negative stimuli maintain or exacerbate their negative moods (Wadlinger & Isaacowitz, 2008). The negative film clip depicted a scene from the movie "The Deer Hunter" in which captured soldiers were forced to play Russian roulette. This clip has been shown to elicit negative affect in participants in prior studies (Campbell-Sills, Barlow, Brown, & Hofmann, 2006) as evidenced by significant mean pre-to-post Positive and Negative Affective Schedule (PANAS) negative affect change scores and participant reports of emotional experiences such as feeling distressed, upset, anxious, and nervous. Participants in the neutral mood condition watched a clip portraying scenery from the film "Denali." Although this clip has been found to induce a mildly pleasant emotional state in some studies (Rottenberg, Ray, & Gross, 2007), researchers have suggested that this is a preferred

alternative to abstract neutral visual displays that may elicit mild annoyance or boredom (Gross & Levenson, 1995).

Demographic Questionnaire

Participants also completed a questionnaire assessing demographic variables, including age, ethnicity, marital status, sexual orientation, education, employment, religious affiliation, household income, life-threatening experiences before eighteen years of age, and parental factors.

Procedure

In the larger study, participants were primarily recruited through announcements posted on Experimetrix, an online service that posts and schedules experiments conducted within psychology departments for course credit. Participants were also recruited directly from undergraduate psychology courses. Students who expressed interest in participating in the study, by providing their electronic mail (e-mail) contact information on the sign-up sheet, received the e-mail contact information and phone number for a study recruiter to sign up. To ensure a sufficient number of participants with sexual abuse histories while maintaining participant privacy, advertisements stated that, "although all [students] are welcome to participate, we are most interested in those with sexual abuse histories." Study procedures were approved by the Institutional Review Board of University of Nebraska-Lincoln.

Trained undergraduate research assistants and three masters-level graduate students administered the experiment. Participants were scheduled individually for data collection sessions lasting approximately two and one half hours. After the participants provided written informed consent to participate in the study, they were

randomly assigned to either a neutral or negative mood condition. Participants were then fitted with the eyetracker apparatus and validation and calibration procedures for the eyetracker were completed on a computer. They then watched the mood induction film clip on a second computer in the same room. After completing another calibration procedure on the first computer, they were informed that they would see a series of positive and negative pictures on the computer screen and they should view the pictures "naturally as if at home while watching TV." The split screen picture-rating task was then administered. Next, participants completed other self-report questionnaires through the Media Lab software installed on a computer in a different room. Finally, participants were debriefed, thanked for their participation, and given course credit in exchange for their participation.

Chapter 3: Data Analyses

The present study utilized an eyetracking procedure to examine participants' attentional biases by capturing their eye movement behavior to 40 trials. Each trial lasted five seconds and depicted two of the three types of emotional (positive, negative, and rape) pictures, which were presented adjacently with a small blank white space in the center separating them. Screens with a picture-rating scale requiring participants to rate how they felt about the just viewed picture were interspersed between the trials and presented until the participants responded. Following the eyetracking task, self-report data on sexual victimization history and current PTSD symptomatology were gathered using questionnaires presented on a computer.

Crossed Random Effects Modeling

Data analyses for the current study were conducted in two parts. A crossed random effects modeling was utilized in the first section to determine the proposed relationships between sexual victimization, PTSD, and attentional biases (aims 1 and 2). For testing hypotheses 1a through 2d, analyses were conducted at the level of individual eye movements, which were nested within 40 trials and within 142 participants, and in which participants and trials were crossed (i.e., every individual received every trial). Additionally, because participants vary in the timing of eye movements during the time course of gaze across trials, multilevel models with participants and trials as crossed random effects were used to account for the resulting unbalanced data. A crossed random effects modeling also permitted the most accurate test of the effects of predictors while capturing all sources of variation simultaneously (Hoffman & Rovine, 2007). Participants' visual attentional patterns (see Table 1 for a

description of visuo-motor behaviors of interest that were used to infer attentional biases in the current study), including first fixation time, first run dwell time, overall dwell time, and run count, served as the dependent variables in these analyses.

The present study investigated participants' preference for a certain type of emotional picture (e.g., rape) when paired with one of the two kinds of contrasting pictures (e.g., positive and negative). Thus, the only predictor variable for the pictures to explain item-level variance was slide type, which refers to the kind of contrasting picture that a picture was paired with. The three slide types used in the current study included rape slide type that includes trials where a rape picture is paired with either a positive or negative picture; positive slide type that includes trials where a positive picture is paired with either a rape or negative picture; and negative slide type that includes trials where a negative picture is paired with either a positive or rape picture. Each slide type included two picture comparisons. For example, rape slide type includes a comparison between rape pictures paired with positive pictures and rape pictures paired with negative pictures. Positive slide type includes a comparison between positive pictures paired with negative pictures and positive pictures paired with rape pictures, and negative slide type includes a comparison between negative pictures paired with positive pictures and negative pictures paired with rape pictures.

Table 1

Description of Visual Attentional Patterns Used to Infer Attentional Biases in the Current Study

Type of Visual Attentional Pattern	Operationalization
First Fixation Time (milliseconds)	Refers to the amount of time that elapses following the start of each trial until the first fixation on each picture. First fixation time is measured for all three types of slide type comparisons: rape, positive, and negative. In a slide type comparison (e.g., rape-positive slide type where a rape picture is paired with a positive picture), higher first fixation time for one picture (e.g., rape) indicates a bias towards slowly fixating first gaze on that picture (rape) at the start of the trial when compared to the other picture that it was paired with (positive).
First Run Dwell Time (milliseconds)	Refers to the amount of time participants spend on each picture the first time they look at it during each trial. First run dwell time is measured for all three types of slide type comparisons: rape, positive, and negative. In a slide type comparison (e.g., rape-positive slide type where a rape picture is paired with a positive picture), higher first run dwell time for one picture (e.g., rape) indicates a bias towards dwelling longer the first time they looked at that picture (rape) at the start of the trial as opposed to the other picture that it was paired with (positive).
Dwell Time (milliseconds)	Refers to the amount of time participants spend looking at each type of picture during each trial. Dwell time is measured for all three types of slide type comparisons: rape, positive, and negative. In a slide type comparison (e.g., rape-positive slide type where a rape picture is paired with a positive picture), higher dwell time for one picture (e.g., rape) indicates a bias towards dwelling longer on that picture (rape) as opposed to the other picture that it was paired with (positive).
Run Count	Refers to the number of times participants revisit each type of picture during each trial (i.e., number of gaze aversions and returns). Run count is measured for all three types of slide type comparisons: rape, positive, and negative. In a slide type comparison (e.g., rape-positive slide type where a rape picture is paired with a positive picture), higher run count for one picture (e.g., rape) indicates a bias towards greater revisits to that picture (rape) when compared to the other picture it was paired with (positive).

Although the primary hypotheses pertained to rape picture comparisons (i.e., rape-positive versus rape-negative trials), we conducted exploratory analyses on how the proposed patterns present for positive and negative picture comparisons as well.

There were three predictor variables for participants. The first one was victimization history, which was classified into three groups: revictimized (i.e., sexual victimization in childhood/adolescence *and* adulthood), singly victimized (i.e., sexual victimization in childhood/adolescence *or* adulthood), and nonvictims (i.e., no sexual victimization history). Total PTSD symptom score as well as the PTSD symptom cluster scores (i.e., 'B' indicating intrusive recollection or re-experiencing symptoms, 'C' indicating avoidant/numbing symptoms, and 'D' indicating hyperarousal) on the PCL-C questionnaire served as another set of predictors of participant variation. Each PTSD variable (total and three cluster scores) was specified as a nested fixed effect pertaining only to victims. Participants' mood condition (i.e., whether they were shown negative or neutral mood induction film clips prior to the eyetracking task) was another subject predictor that was included in the model analyses to assess and control for its effect on attentional outcome variables.

The first step in crossed random effects modeling involved determining whether participants and pictures should be considered as random factors to account for variation among participants (e.g., some participants may have looked at a picture in the pair of stimuli longer than other participants did) and variation among pictures (e.g., some pictures were looked at longer than other pictures each time participants looked) for attentional outcome variables. In other words, we first examined the extent of systematic mean differences in the four attentional outcome variables across

participants and across pictures by estimating three empty crossed random effects models without predictors for each attentional outcome variable. We began by estimating a baseline empty means model with no predictors but only residual variance for each picture comparisons that assumed no random effects or systematic mean differences between participants or between pictures for each attentional outcome variable. Thereafter, we estimated a model that included random intercept for subjects (i.e., mean differences across participants) followed by another model that included random intercept for items (i.e., mean differences across pictures) for each attentional outcome variable.

Restricted maximum likelihood (REML) was used to report model parameters and the Satterthwaite method was used to estimate denominator degrees of freedom. The significance of random effects, meaning the improvement in fit from adding subject and item random intercepts, was evaluated by comparing the deviance values of the models using −2 log-likelihood (−2ΔLL) tests and information criteria (AIC and BIC) between models with the same fixed effects. The −2ΔLL or deviance difference test is typically distributed as a chi-square with degrees of freedom equal to the difference in the number of estimated model parameters. However, when the added variance parameters have possible values that are bounded at zero, the −2ΔLL is actually distributed as a combination of chi-square distributions with degrees of freedom and degrees of freedom minus one. To acknowledge that −2ΔLL is only approximately distributed for parameters with possible values with a boundary, we used a more conservative significance test for the difference in model fit by using the

original degrees of freedom (this will be indicated by adding '~' in front of the test degrees of freedom; Hoffman, n.d.).

In the next step, sequential conditional models were tested to examine the effects of predictors, including victimization history, PTSD symptoms, slide type, and mood condition, on each attentional outcome variable for each type of picture comparison. We began with rape picture comparisons assessing the effect of predictors on first fixation time. This allowed for a test of hypotheses that participants' sexual victimization history (hypothesis 1a) as well as PTSD symptoms in survivors (hypothesis 2a) would predict how quickly they looked at rape pictures when paired with positive or negative pictures. We then examined the effect of slide type, which refers to the kind of contrasting image that is paired with rape pictures to determine whether participants' first fixation time for rape pictures differs based on the type of picture it was paired with (i.e., positive or negative). We also analyzed the effect of mood condition to determine whether participants' first fixation time for rape pictures differs based on the type of mood induction film clip (i.e., negative or neutral) they saw prior to the eyetracking task. Similarly, we examined the effect of predictors on the remaining attentional outcome variables (first run dwell time, overall dwell time, and run count) for rape picture comparisons. A series of conditional models was estimated by removing nonsignificant interactions each time until the final fitted crossed random effects model with interpretable parameters was obtained. Subsequent to these primary analyses for rape picture comparisons, we also conducted crossed random effects models for positive and negative picture comparisons.

Table 2 to Table 5 present results from the final empty means crossed random effects models with random intercepts for both participants and pictures for each attentional outcome variable within each picture comparison. These tables also provide the fixed and random effect estimates obtained from the final fitted conditional crossed random effects models for each attentional outcome variable within each picture comparison.

Generalized Linear Mixed Modeling

The second section of data analyses examined changes in the probability of participants' fixations on a rape picture as compared to the contrasting picture that it was paired with (i.e., positive or negative). This provided a test of hypothesis 3 that proposed that participants' fixations on rape picture (as opposed to the contrasting picture) may vary across the five-second trial duration. The dependent variable was a dichotomous or binary variable that records whether participants looked at rape picture versus the other picture (i.e., positive or negative) across the trial duration. A generalized linear mixed model was conducted to account for the binary outcome variable where the assumption of continuous scores and the residual normality assumption are violated (Hox, 2010). In utilizing this growth modeling, the non-normal outcome variable was transformed into a continuous variable using a logit link function that represents the natural logarithm of odds ratio (i.e., log of the odds of the probability of one) where predictors are combined in a linear combination to predict the link-transformed outcome.

The first step in the analyses was to determine whether there was significant within-cluster interdependence to warrant the use of a multilevel approach. Then,

models were estimated for rape picture slides using PROC GLIMMIX procedure and Laplace estimation method in SAS. First, an unconditional model with random intercepts for persons and slides model that predicts no change in the dependent variable on average was assessed as a baseline model for comparison of fit of subsequent models. Thereafter, fixed effects of predictors (victimization history and slide type) as well as fixed and random effects of time were added sequentially and analyzed. In this study, fixations were nested within slides, which were nested within persons, and time was centered such that 0 indicated the start of a trial. The random effects associated with level-1 fixation time were examined at level 2 (i.e., slide within person) and at level 3 (i.e., person) to assess whether the effect of predictors varied over slides and persons. For each model that included random slopes for time, random slopes were added in level 2 RANDOM statement first, which if significant, was subsequently added in level 3. The significance of random effects was evaluated using $-2\Delta LL$ tests and information criteria between models with the same fixed effects. The significance of fixed effects was evaluated using Wald test ($p < .05$).

Chapter 4: Results

Preliminary Analyses

Based on the responses from the CTQ, CAMI, and MSES, 48.1% (*n* = 74) of participants reported a history of sexual victimization in childhood/adolescence or adulthood, 18.2% (*n* = 28) in both childhood/adolescence and adulthood, and 33.8% (*n* = 52) with no sexual victimization history.

Primary Analyses

Results from the crossed random effects modeling are presented first to elucidate the effects of predictors (victimization, PTSD, slide type, and mood condition) on four attentional outcome variables within each of the three types of emotional picture comparisons. Specifically, findings regarding the extent of systematic mean differences in each attentional outcome variable across participants and pictures, and the need for subjects and items to be modeled as random effects are presented. Thereafter, results from the hypothesized conditional models that depict the extent to which these systematic mean differences are explained by predictors are presented. Following this, findings from the generalized linear mixed modeling regarding changes in the probability of participants' fixations for rape pictures across trial duration are presented.

Crossed Random Effects Models for Rape Picture Comparisons

First fixation time. First fixation time for rape pictures refers to the relative length of time that elapsed from the onset of the trial until the rape picture of the pair of stimuli received the first fixation. A series of empty crossed random effects models indicated that, in rape picture comparisons, there were relatively greater systematic

mean differences in first fixation time across pictures than across participants. The empty means model that included both variances across pictures and participants (random items and subjects model with random intercepts for items and subjects) showed better model fit than the empty means model with only variation across participants (random subjects model with only random subject intercept) as indicated by significant deviance difference and relatively smaller AIC and BIC values. Indeed, compared to the random subjects model, the random items and subjects model indicated that there was significant variability in first fixation time for rape pictures across participants, $-2\Delta LL(\sim 1) = 6.2$, $p < .02$, and across pictures, $-2\Delta LL(\sim 1) = 445$, $p < .001$, such that 6% of the total variation in first fixation time was due to systematic mean differences across participants, 29.49% was due to mean differences across pictures, and the remaining 64.26% was due to participant by picture interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses. A 95% random effects confidence intervals was then computed to describe the size of random variation across participants and across pictures using the formula: fixed intercept ± 1.96*SQRT (random intercept variance), results of which are included in Table 2.

Table 2

Results for Empty Means and Conditional Crossed Random Effects Models for First Fixation Time within Each Picture Comparisons

	Rape Picture Comparisons (Rape-Negative vs. Rape-Positive)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**673.90**	124.66	<.0001
Slide Type (rape-neg)				55.92	171.83	0.75
Victimization Group (singly victimized)				-4.97	32.65	0.88
Victimization Group (revictimized)				-13.65	41.48	0.74
Mood Condition (negative)				-38.77	28.63	0.18
PTSD Total				-0.21	1.25	0.87
Model for the Variance						
Subject Random Intercept Variance	**13884**	3400.3	<.0001	**14285**	3496.05	<.0001
Item Random Intercept Variance	**65473**	31338	0.02	**72806**	36905	0.02
Residual Variance	**142674**	5664.08	<.0001	**142674**	5664.08	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	21008.9					
REML AIC	21014.9					
REML BIC	21009.9					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject First Fixation Time Means	446.48 – 908.38					
Individual Item First Fixation Time Means	175.91 – 1178.95					

	Positive Picture Comparisons (Positive-Negative vs. Positive-Rape)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**687.51**	183.58	0.001
Slide Type (pos-neg)				116.94	204.63	0.57
Victimization Group (singly victimized)				-56.29	35.45	0.11
Victimization Group (revictimized)				-93.28	45.03	0.05
Mood Condition (negative)				-9.21	31.09	0.77
PTSD Total				0.68	1.36	0.62
Model for the Variance						
Subject Random Intercept Variance	**19026**	4049.65	<.0001	**18830**	4084.31	<.0001
Item Random Intercept Variance	**156430**	47890	<.001	**161445**	50564	0.001
Residual Variance	**341085**	8660.76	<.0001	**341085**	8660.76	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	51078.1					
REML AIC	51084.1					
REML BIC	51078.1					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject First Fixation Time Means	458.10 – 998.80					
Individual Item First Fixation Time Means	-46.75 – 1503.65					

	Negative Picture Comparisons (Negative-Rape vs. Negative-Positive)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**564.9**	63.09	<.0001
Slide Type (neg-rape)				56.9	123.31	0.65
Victimization Group (singly victimized)				-27.19	29.5	0.36
Victimization Group (revictimized)				-17.97	37.48	0.63
Mood Condition (negative)				5.51	25.87	0.83
PTSD Total				-0.57	1.13	0.62
Model for the Variance						
Subject Random Intercept Variance	**16779**	2724.09	<.0001	**17253**	2820.61	<.0001
Item Random Intercept Variance	**56387**	17297	<.001	**58515**	18361	<.001
Residual Variance	**139308**	3537.27	<.0001	**139308**	3537.27	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	48222.5					
REML AIC	48228.5					
REML BIC	48222.5					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject First Fixation Time Means	308.55 – 816.33					
Individual Item First Fixation Time Means	97.02 – 1027.86					

Note. Bold values are $p < .05$.

Sequential crossed random effects conditional models examined the effects of victimization and PTSD symptoms on first fixation time for rape pictures. Specifically, we tested hypothesis 1a that sexually victimized women, particularly those with revictimization experiences, would quickly fix their first gaze on rape pictures than the contrasting picture in the pair, when compared to women with victimization in either childhood or adulthood (singly victimized), or no victimization. We also examined hypothesis 2a that survivors higher in PTSD symptoms would quickly fix their first gaze on rape pictures when compared to survivors lower in PTSD symptoms. Although victimization and PTSD were the primary variables of interest, we also explored the effects of slide type, which refers to the kind of contrasting picture (e.g., positive or negative) that is paired with rape pictures, to determine whether participants' first fixation time for rape pictures differs based on the contrasting picture. We also tested the effect of mood condition to determine whether participants' first fixation time for rape pictures differs based on whether they saw negative or neutral mood induction film clip prior to the eyetracking procedure. A series of models was estimated by removing nonsignificant interactions each time until the final crossed random effects model with meaningful (i.e., contributing) parameters was obtained (see Table 2 for final model).

Analyses yielded no significant main effects for item or subject predictors on first fixation time for rape pictures when paired with positive or negative pictures. Survivors, irrespective of their revictimization status and PTSD symptom levels, did not engage in faster first fixation for rape pictures than nonvictims did. Thus, there was zero reduction in the item variation and the subject variation in first fixation time,

indicating that the variability in preferential first fixation time for rape pictures across participants and pictures was unaccounted for by the predictors in the current study.

Summary. The findings from conditional models revealed that participants did not differ in how rapidly they fix their first gaze on rape pictures, suggesting that sexually victimized women did not show shorter first fixation time for visual trauma-related stimuli than nonvictims as predicted. Moreover, survivors' revictimization status and PTSD symptoms, their mood condition, and the contrasting picture that was paired with rape pictures did not predict faster first fixation time for trauma-related stimuli.

First run dwell time. First run dwell time for rape pictures refers to the relative length of time participants spent looking at the rape picture the first time they visited it. Compared to the empty means, random subjects model, the better fitting random items and subjects model indicated that there was significant variability in first run dwell time for rape pictures, $-2\Delta LL(\sim 1) = 367.1$, $p < .001$, such that 10.6% of the total variation in first run dwell time was due to systematic mean differences across participants, 24.18% was due to mean differences across pictures, and the remaining 65.21% was due to participant by picture interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses.

Sequential crossed random effects conditional models examined the effects of victimization and PTSD symptoms on first run dwell time for rape pictures, allowing a test of hypotheses that participants' sexual revictimization history (hypothesis 1b) as well as PTSD symptoms in survivors (hypothesis 2b) would predict how long they

dwell the first time they looked at the rape picture of the pair of stimuli. Additionally, the effects of slide type as well as mood condition were examined. The results from the final crossed random effects conditional model are included in Table 3.

Table 3

Results for Empty Means and Conditional Crossed Random Effects Models for First Run Dwell Time within Each Picture Comparisons

	Rape Picture Comparisons (Rape-Negative vs. Rape-Positive)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**1540.38**	164.44	<.0001
Slide Type (rape-neg)				**-527.55**	216.47	0.04
Victimization Group (singly victimized)				-38.72	69.24	0.58
Victimization Group (revictimized)				-38.95	87.95	0.66
Mood Condition (negative)				-52.47	60.72	0.39
PTSD Total				2.17	2.66	0.42
Model for the Variance						
Subject Random Intercept Variance	**78152**	15149	<.0001	**80357**	15629	0.03
Item Random Intercept Variance	**178057**	85532	0.02	**113764**	58574	<.0001
Residual Variance	**480319**	19068	<.0001	**480319**	19068	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	22769.9					
REML AIC	22775.9					
REML BIC	22769.9					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject First Run Dwell Time Means	677.35 – 1773.21					
Individual Item First Run Dwell Time Means	398.22 – 2052.34					

	Positive Picture Comparisons (Positive-Negative vs. Positive-Rape)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**603.26**	116.78	<.0001
Slide Type (pos-neg)				97.76	124.49	0.44
Victimization Group (singly victimized)				-56.88	43.81	0.20
Victimization Group (revictimized)				-66.88	55.66	0.23
Mood Condition (negative)				10.81	38.42	0.78
PTSD Total				-2.62	1.68	0.12
Model for the Variance						
Subject Random Intercept Variance	**41481**	6168	<.0001	**41147**	6216.84	<.0001
Item Random Intercept Variance	**57923**	17966	<..001	**58979**	18714	<.001
Residual Variance	**236014**	5992.83	<.0001	**236014**	5992.83	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	49974.1					
REML AIC	49980.1					
REML BIC	49974.1					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject First Run Dwell Time Means	242.38 – 1040.76					
Individual Item First Run Dwell Time Means	169.85 – 1113.29					

	Negative Picture Comparisons (Negative-Rape vs. Negative-Positive)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**1214.18**	105.96	<.0001
Slide Type (neg-rape)				-255.10	188.89	0.19
Victimization Group (singly victimized)				-46.73	66.2	0.48
Victimization Group (revictimized)				-129.34	84.1	0.13
Mood Condition (negative)				-68.11	58.05	0.24
PTSD Total				1.59	2.54	0.53
Model for the Variance						
Subject Random Intercept Variance	**97002**	13947	**<.**0001	**97342**	14190	<.0001
Item Random Intercept Variance	**141602**	43673	<.001	**136374**	43087	<.001
Residual Variance	**460656**	11697	<.0001	**460656**	11697	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	52183.2					
REML AIC	52189.2					
REML BIC	52183.2					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject First Fixation Time Means	466.99 – 1687.87					
Individual Item First Fixation Time Means	339.88 – 1814.98					

Note. Bold values are $p < .05$.

In the final model, the fixed intercept of 1540.38 indicates that, for nonvictims in the neutral mood condition, the expected first run dwell time for rape pictures when paired with positive pictures was 1540.38 ms.

Contrary to hypothesis 1b, the main effect of victimization on first run dwell time for rape pictures was nonsignificant, $F(2, 137) = 0.18$, $p = .84$, indicating that there were no overall differences among women with experiences of revictimization, single victimization, and no victimization in how long they dwelled the first time they looked at rape pictures when their PTSD total symptom score was at the average score of 31. This suggests that all participants, regardless of their victimization history, dwelled on rape pictures to the same extent the first time they looked at them when they had average PTSD total symptom score. Contrary to hypothesis 2b, the main effect of PTSD total symptom score on survivors' first run dwell time for rape pictures was nonsignificant, $F(1, 137) = 0.67$, $p = .42$, indicating that survivors did not differ in how long they dwelled the first time they looked at rape pictures depending on variations in their PTSD total symptom score. Similarly, the three PTSD symptom clusters did not have an effect on survivors' first run dwell time in the current sample as indicated by respective nonsignificant main effects. The results of PTSD symptom clusters are not included in Table 3 given that the parameter values for other predictors have also changed (although the significance of these predictor values did not change from the model including PTSD total score).

Exploratory analyses revealed that there was a significant main effect of slide type on participants' first run dwell time for rape pictures, indicating that participants showed overall differences in how long they dwelled the first time they looked at rape

pictures depending on whether rape pictures were paired with positive pictures versus negative pictures, $F(1, 8) = 5.94$, $p = .04$. Specifically, participants dwelled 527.55 ms less the first time they looked at rape pictures when paired with negative pictures as opposed to positive pictures. However, slide type did not interact with victimization or mood condition. Finally, the main effect of participants' mood condition on first run dwell time for rape pictures was nonsignificant, $F(1, 137) = 0.75$, $p = .39$, such that participants showed no overall differences in first run dwell time for rape pictures when they were shown negative versus neutral mood induction film clip. Furthermore, mood condition did not interact with victimization.

Regarding the extent that the final model explained variability in first run dwell time, the item predictor, slide type accounted for 36.11% of the item variation in first run dwell time for rape pictures. The subject predictors however did not account for any subject variation in first run dwell time for rape pictures. Therefore, a significant proportion of variability in preferential first run dwell time for rape pictures across participants and pictures remains unaccounted for by the predictors used in this study.

Summary. The results from conditional models revealed that sexually victimized women did not differ from nonvictims in their attentional engagement during their first fixation on visual trauma-related stimuli. However, participants were more likely to dwell longer the first time they looked at rape pictures when these were paired with positive pictures as opposed to negative pictures. No other factors predicted longer first run dwell time for trauma-related stimuli in survivors.

Dwell time. Dwell time in rape picture comparisons refers to the relative length of time participants spent looking at rape pictures on average. The empty means, random items and subjects model showed better model fit than the random subjects model as indicated by significant deviance difference and relatively smaller AIC and BIC values. Indeed, compared to the random subjects model, the random items and subjects model indicated that there was significant variability in dwell time for rape pictures across participants, $-2\Delta LL(\sim 1) = 12$, $p < .001$, and across pictures, $-2\Delta LL(\sim 1) = 369$, $p < .0001$, such that 7.2% of the total variation was due to systematic mean differences across participants, 25.19% was due to mean differences across pictures, and the remaining 67.57% was due to participant by picture interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses.

Sequential crossed random effects conditional models were tested to examine the effects of victimization and PTSD symptoms on dwell time for rape pictures. Specifically, we tested hypothesis 1c that revictimized women would dwell longer on rape pictures on average when compared with women with single victimization experience or no victimization. We also examined hypothesis 2c that survivors higher in PTSD symptoms would dwell longer on rape pictures on average when compared with survivors lower in PTSD symptoms. Additionally, we explored the effect of slide type as well as mood condition. The results from the final crossed random effects conditional model are reported in Table 4.

Table 4

Results for Empty Means and Conditional Crossed Random Effects Models for Dwell Time within Each Picture Comparisons

	Rape Picture Comparisons (Rape-Negative vs. Rape-Positive)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**2486.82**	141.16	<.0001
Slide Type (rape-neg)				**-590.77**	185.98	0.01
Victimization Group (singly victimized)				-55.44	59.87	0.36
Victimization Group (revictimized)				-62.31	76.05	0.41
Mood Condition (negative)				-40.56	52.50	0.44
PTSD Total				2.20	2.30	0.34
Model for the Variance						
Subject Random Intercept Variance	**49048**	11437	<.0001	**50223**	11739	<.0001
Item Random Intercept Variance	**170589**	81936	0.02	**83251**	43237	0.03
Residual Variance	**457646**	18168	<.0001	**457646**	18168	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	22667.8					
REML AIC	22673.8					
REML BIC	22667.8					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject Dwell Time Means	1698.95 – 2567.11					
Individual Item Dwell Time Means	1323.5 – 2942.56					

	Positive Picture Comparisons (Positive-Negative vs. Positive-Rape)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**1520.8**	129.01	<.0001
Slide Type (pos-neg)				-10.38	138.64	0.94
Victimization Group (singly victimized)				-54.29	45.59	0.24
Victimization Group (revictimized)				-56.97	57.91	0.33
Mood Condition (negative)				43.26	39.98	0.28
PTSD Total				**-4.43**	1.75	0.01
Model for the Variance						
Subject Random Intercept Variance	**41890**	6886.86	<.0001	**39827**	6737.5	<.0001
Item Random Intercept Variance	**69248**	21652	<.001	**72647**	23211	<.001
Residual Variance	**364245**	9248.86	<.0001	**364245**	9248.86	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	51339.7					
REML AIC	51345.7					
REML BIC	51339.7					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject Dwell Time Means	1091.26 – 1893.56					
Individual Item Dwell Time Means	976.64 – 2008.18					

	Negative Picture Comparisons (Negative-Rape vs. Negative-Positive)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**2417.1**	79.39	<.0001
Slide Type (neg-rape)				**-436.74**	142.33	0.01
Victimization Group (singly victimized)				33.11	49.75	0.51
Victimization Group (revictimized)				-13.63	63.2	0.83
Mood Condition (negative)				-64.46	43.63	0.14
PTSD Total				0.84	1.91	0.66
Model for the Variance						
Subject Random Intercept Variance	**45742**	7850.41	<.0001	**46251**	8025.05	<.0001
Item Random Intercept Variance	**106350**	33044	<.001	**76027**	24464	0.001
Residual Variance	**460804**	11701	<.0001	**460804**	11701	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	52096.8					
REML AIC	52102.8					
REML BIC	52096.8					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject Dwell Time Means	1885.66 – 2724.04					
Individual Item Dwell Time Means	1665.67 – 2944.03					

Note. Bold values are $p < .05$.

In the final model, the fixed intercept of 2486.82 indicates that, for nonvictims in the neutral mood condition, the expected dwell time for rape pictures when paired with positive pictures was 2486.82 ms.

Contrary to hypothesis 1c, the conditional main effect of victimization on dwell time for rape pictures was nonsignificant, $F(2, 137) = 0.52$, $p = .60$, indicating that there were no overall differences among women with experiences of revictimization, single victimization, and no victimization in how long they spent looking at rape pictures when their PTSD total symptom score was at the average (i.e., a score of 31 on the PCL-C). This suggests that all participants dwelled on rape pictures to the same extent regardless of their victimization history when they had average PTSD total symptom score.

Contrary to hypothesis 2c, the main effect of PTSD total symptom score on survivors' dwell time for rape pictures was nonsignificant, $F(1, 137) = 0.92$, $p = .34$, indicating that survivors did not differ in how long they dwelled on rape pictures depending on variations in their PTSD total symptom score. Similarly, the three PTSD symptom clusters did not have an effect on survivors' dwell time in the current sample as indicated by respective nonsignificant main effects. The results of PTSD symptom clusters are not included in Table 4. The other predictors, slide type and mood condition, did not moderate the effect of PTSD symptoms on survivors' dwell time for rape pictures.

Exploratory analyses revealed that there was also a significant main effect of slide type on participants' dwell time for rape pictures, indicating that participants showed overall differences in how long they spent looking at rape pictures depending

on whether rape pictures were paired with positive pictures versus negative pictures, $F(1, 8) = 10.09$, $p = .01$. Specifically, participants looked 590.77 ms less at rape pictures when paired with negative pictures as opposed to positive pictures. However, slide type did not interact with victimization or mood condition. Finally, the main effect of participants' mood condition on dwell time for rape pictures was nonsignificant, $F(1, 137) = 0.60$, $p = .44$, such that participants showed no overall differences in dwell time for rape pictures when they were shown negative versus neutral mood induction film clip. Furthermore, mood condition did not interact with victimization.

Regarding the extent that the final model explained variability in dwell time, the item predictor, slide type accounted for 51.2% of the item variation in dwell time for rape pictures. The subject predictors, including victimization, PTSD, and mood condition, however, accounted for 0% of the subject variation in dwell time for rape pictures. Therefore, a significant proportion of variability in preferential dwell time for rape pictures across participants and pictures remains unaccounted for by the predictors used in this study.

Summary. The results from conditional models revealed that higher levels of PTSD symptomatology, particularly avoidance and numbing symptoms, predicted longer dwell time for rape pictures among sexually victimized women. Thus, survivors with high PTSD exhibited greater problems disengaging attention from visual trauma-related stimuli. All women in the sample were more likely to dwell longer on rape pictures when these were paired with positive pictures rather than negative pictures.

Run count. Run count in rape picture comparisons refers to the number of times participants return to the rape picture after looking away from it. Compared to the empty means, random subjects model, the better fitting random items and subjects model indicated that there was significant variability in run count for rape pictures across participants, $-2\Delta LL(\sim 1) = 32$, $p < .0001$, and across pictures, $-2\Delta LL(\sim 1) = 94.6$, $p < .0001$, such that 9.1% of the total variation in run count was due to systematic mean differences across participants, 8.1% was due to mean differences across pictures, and the remaining 82.79% was due to participant by picture interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses.

Sequential crossed random effects conditional models examined the effects of victimization and PTSD symptoms on run count for rape pictures, allowing a test of hypotheses that participants' sexual revictimization history (hypothesis 1d) as well as PTSD symptoms in survivors (hypothesis 2d) would predict how often they revisit rape pictures when paired with positive or negative pictures. We also examined the effects of slide type as well as mood condition. The results from the final crossed random effects conditional model are reported in Table 5.

Table 5

Results for Empty Means and Conditional Crossed Random Effects Models for Run Count within Each Picture Comparisons

	Rape Picture Comparisons (Rape-Negative vs. Rape-Positive)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**1.94**	0.12	<.0001
Slide Type (neg-rape)				-0.01	0.15	0.97
Victimization Group (singly victimized)				-0.02	0.06	0.78
Victimization Group (revictimized)				0.06	0.08	0.47
Mood Condition (negative)				0.03	0.05	0.55
PTSD Total				0.001	0.002	0.82
Model for the Variance						
Subject Random Intercept Variance	**0.05**	0.01	<.0001	**0.05**	0.03	0.03
Item Random Intercept Variance	**0.05**	0.02	0.02	**0.05**	0.03	0.03
Residual Variance	**0.46**	0.02	<.0001	**0.46**	0.02	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	3074.6					
REML AIC	3080.6					
REML BIC	3074.6					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject Run Count Means	1.51 – 2.40					
Individual Item Run Count Means	1.54 – 2.37					

	Positive Picture Comparisons (Positive-Negative vs. Positive-Rape)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**2.14**	0.15	<.0001
Slide Type (pos-neg)				-0.05	0.16	0.76
Victimization Group (singly victimized)				-0.07	0.06	0.27
Victimization Group (revictimized)				-0.01	0.07	0.87
Mood Condition (negative)				-0.004	0.05	0.93
PTSD Total				-0.002	0.002	0.47
Model for the Variance						
Subject Random Intercept Variance	**0.07**	0.01	<.0001	**0.07**	0.01	<.0001
Item Random Intercept Variance	**0.09**	0.03	<.001	**0.09**	0.03	<.001
Residual Variance	**0.48**	0.01	<.0001	**0.48**	0.01	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	7161.7					
REML AIC	7167.7					
REML BIC	7161.7					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject Run Count Means	1.55 – 2.59					
Individual Item Run Count Means	1.48 – 2.65					

	Negative Picture Comparisons (Negative-Rape vs. Negative-Positive)					
	Empty Means, Random Intercept Model			Crossed Subjects and Items Conditional Model with Random Intercepts		
Model Effects	Estimate	SE	*p*	Estimate	SE	*p*
Model for the Means						
Intercept				**2.21**	0.09	<.0001
Slide Type (neg-rape)				-0.09	0.14	0.53
Victimization Group (singly victimized)				-0.003	0.06	0.96
Victimization Group (revictimized)				0.03	0.08	0.73
Mood Condition (negative)				-0.003	0.06	0.95
PTSD Total				0.0004	0.002	0.89
Model for the Variance						
Subject Random Intercept Variance	**0.09**	0.01	<.0001	**0.09**	0.01	<.0001
Item Random Intercept Variance	**0.08**	0.02	<.001	**0.08**	0.03	<.001
Residual Variance	**0.45**	0.01	<.0001	**0.45**	0.01	<.0001
Model Fit						
Number of Parameters	3					
REML –2LL	7000.2					
REML AIC	7006.2					
REML BIC	7000.2					
95% Random Effects Confidence Intervals from Empty Means Random Intercept Model						
Individual Subject First Fixation Time Means	1.60 – 2.78					
Individual Item First Fixation Time Means	1.65 – 2.73					

Note. Bold values are $p < .05$.

Analyses yielded no significant main effects for item or subject predictors on run count for rape pictures when paired with positive or negative pictures. Survivors, irrespective of their revictimization status and PTSD symptom levels, did not differ from nonvictims in how often they returned to the rape pictures. Thus, there was zero reduction in the item variation and the subject variation in run count, indicating that the variability in preferential run count for rape pictures across participants and pictures was unaccounted for by the predictors in the current study.

Summary. The findings from conditional models revealed that participants did not differ in how often they returned to the rape pictures, suggesting that sexually victimized women did not show frequent returns to visual trauma-related stimuli than nonvictims as predicted. Moreover, survivors' revictimization status and PTSD symptoms, their mood condition, and the contrasting picture that was paired with rape pictures did not predict frequent run count for trauma-related stimuli.

Crossed Random Effects Models for Positive Picture Comparisons

First fixation time. Compared to the empty means, random subjects model, the better fitting random items and subjects model indicated that there was significant variability in first fixation time for positive pictures across participants, $-2\Delta LL(\sim 1) = 15.5$, $p < .001$, and across pictures, $-2\Delta LL(\sim 1) = 1087.1$, $p < .001$, such that 4% of the total variation in first fixation time was due to systematic mean differences across participants, 30.28% was due to mean differences across pictures, and the remaining 66.03% was due to participant by picture interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses.

The findings from the final crossed random effects conditional model (see Table 2) indicated that there were no significant main effects or interactions of item or subject predictors on first fixation time for positive pictures when paired with contrasting pictures. There was zero reduction in the item variation and 1% reduction in the subject variation in first fixation time. Thus, the variability in preferential first fixation time for positive pictures across participants and pictures was unaccounted for by the predictors used in this study.

Summary. The findings from conditional models revealed that victimization and the presence of PTSD symptomatology did not predict first fixation time for positive pictures.

First run dwell time. Compared to the empty means, random subjects model, the better fitting random items and subjects model indicated that there was significant variability in first run dwell time for positive pictures across participants, $-2\Delta LL(\sim 1) = 206.7$, $p < .0001$, and across pictures, $-2\Delta LL(\sim 1) = 606.8$, $p < .0001$, such that 12.37% of the total variation in first run dwell time was due to systematic mean differences across participants, 17.27% was due to mean differences across pictures, and the remaining 70.36% was due to participant by picture interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses.

In the current study, we also explored participants' first fixation time for positive pictures in a series of crossed random effects conditional models to detect the effects of predictors. The findings from the analyses exploring participants' first run dwell time for positive pictures (see Table 3) indicated that there were no significant

main effects or interactions of item or subject predictors on first run dwell time for positive pictures when paired with contrasting pictures. There was zero reduction in the item variation and 0.8% reduction in the subject variation in first run dwell time. Thus, a significant proportion of variability in preferential first run dwell time for positive pictures across participants and across pictures remains unaccounted for by the predictors used in this study.

Summary. Taken together, the results from conditional models revealed that victimization and the presence of PTSD symptomatology did not predict first run dwell time for positive pictures.

Dwell time. Compared to the empty means, random subjects model, the better fitting random items and subjects model indicated that there was significant variability in dwell time for positive pictures across participants, $-2\Delta LL(\sim 1) = 120.8$, $p < .0001$, and across pictures, $-2\Delta LL(\sim 1) = 470.4$, $p < .0001$, such that 8.81% of the total variation in dwell time was due to systematic mean differences across participants, 14.57% was due to mean differences across pictures, and the remaining 76.62% was due to participant by picture interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses.

The findings from the final crossed random effects conditional model for dwell time for positive pictures (see Table 4) indicated that there was a significant main effect of PTSD total symptom score on survivors' dwell time for positive pictures, indicating that survivors differed in how long they spent looking at positive pictures depending on their PTSD total symptom score, $F(1, 137) = 6.39$, $p = .01$. Specifically, survivors spent 4.43 ms less time looking at positive pictures with every one-unit

increase in their PTSD total symptom score from the average PTSD score, indicating that survivors with high PTSD symptoms had fewer problems disengaging and switching from positive pictures.

Of the three PTSD symptom clusters (results are not included in Table 4), re-experiencing and avoidance/numbing symptoms appeared to matter most for survivors as indicated by a significant main effect of cluster B on survivors' dwell time for positive pictures, $F(1, 137) = 5.45$, $p = .02$, and a significant main effect of cluster C score on survivors' dwell time for positive pictures, $F(1, 137) = 6.41$, $p = .01$. Specifically, survivors looked 11.72 ms less at positive pictures with every one-unit increase in their re-experiencing symptom score from the average score of 10. Survivors looked 9.98 ms less at positive pictures with every one-unit increase in their avoidance/numbing symptom score from the average avoidance/numbing score of 10. The symptom cluster D (hyperarousal) did not have a significant effect on survivors' dwell time for positive pictures in the current sample, $F(1, 137) = 3.51$, $p = .06$.

There were no other significant main effects or interactions among different predictors. The item predictor, slide type did not account for any item variation in dwell time for positive pictures. The subject predictors, victimization, PTSD, and mood condition, however, accounted for 5% of the subject variation in dwell time for positive pictures. Therefore, a significant of variability in preferential dwell time for positive pictures across participants and pictures remains unaccounted for by the predictors used in this study.

Summary. The findings from conditional models revealed that higher levels of PTSD symptomatology predicted less dwell time for positive visual stimuli among

sexually victimized women. No other predictors accounted for the variability observed across participants and across pictures.

Run count. Compared to the empty means, random subjects model, the better fitting random items and subjects model indicated that there was significant variability in run count for positive pictures, across participants, $-2\Delta LL(\sim 1) = 176.6$, $p < .0001$, and across pictures, $-2\Delta LL(\sim 1) = 457.1$, $p < .0001$, such that 11.1% of the total variation in run count was due to systematic mean differences across participants, 13.87% was due to mean differences across pictures, and the remaining 75.04% was due to participant by picture interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses.

Sequential conditional models examining the effects of predictors on run count for positive pictures (see Table 5) indicated that there were no significant main effects or interactions of item or subject predictors. There was zero reduction in the item variation and the subject variation in run count for positive pictures. Thus, the variability in preferential run count for positive pictures across participants and pictures that is unaccounted for by the predictors used in this study.

Summary. The findings from conditional models revealed that the predictors in the model did not predict run count for positive stimuli.

Crossed Random Effects Models for Negative Picture Comparisons

First fixation time. Compared to the empty means, random subjects model, the better fitting random items and subjects model indicated that there was significant variability in first fixation time for negative pictures across participants, $-2\Delta LL(\sim 1) = 90$, $p < .001$, and across pictures, $-2\Delta LL(\sim 1) = 972.2$, $p < .001$, such that 7.9% of the

total variation in first fixation time was due to systematic mean differences across participants, 26.54% was due to mean differences across pictures, and the remaining 65.56% was due to participant by picture interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses.

The findings from the final crossed random effects conditional model for first fixation time for negative pictures (see Table 2) indicated that there were no significant main effects or interactions of item or subject predictors on first fixation time for negative pictures when paired with contrasting pictures. There was zero reduction in the item variation and the subject variation in first fixation time. Thus, the variability in preferential first fixation time for negative pictures across participants and pictures is unaccounted for by the predictors used in this study.

Summary. The findings from conditional models revealed that the predictors in the model did not predict first fixation time for negative pictures.

First run dwell time. Compared to the empty means, random subjects model, the better fitting random items and subjects model indicated that there was significant variability in first run dwell time for negative pictures, across participants, $-2\Delta LL(\sim 1) = 244.7$, $p < .001$, and across pictures, $-2\Delta LL(\sim 1) = 753.7$, $p < .001$, such that 13.87% of the total variation in first run dwell time was due to systematic mean differences across subjects, 20.25% was due to mean differences across items, and the remaining 65.88% was due to subject by item interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses.

The findings from the final crossed random effects conditional model for first run dwell time for negative pictures (see Table 3) indicated that there were no significant main effects or interactions of item or subject predictors on first run dwell time for negative pictures when paired with contrasting pictures. There was 3.7% reduction in the item variation and zero reduction in the subject variation in first run dwell time. Thus, a significant proportion of variability in preferential first run dwell time for negative pictures across participants and across pictures remains unaccounted for by the predictors used in this study.

Summary. The findings from conditional models revealed that victimization and the presence of PTSD symptomatology did not predict first run dwell time for positive pictures.

Dwell time. Compared to the empty means, random subjects model, the better fitting random items and subjects model indicated that there was significant variability in dwell time for negative pictures across participants, $-2\Delta LL(\sim 1) = 88.7$, $p < .0001$, and across pictures, $-2\Delta LL(\sim 1) = 571.3$, $p < .0001$, such that 7.5% of the total variation in dwell time was due to systematic mean differences across participants, 17.35% was due to mean differences across pictures, and the remaining 75.18% was due to participant by picture interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses.

The findings from the final crossed random effects conditional model for dwell time for negative pictures (see Table 4) indicated that there was a significant main effect of slide type on participants' dwell time for negative pictures, such that participants showed overall differences in how long they spent looking at negative

pictures when paired with positive pictures versus rape pictures, $F(1, 21) = 9.42$, $p = .01$. Specifically, participants spent 436.74 ms less time looking at negative pictures when paired with rape pictures as opposed to positive pictures. There were no other significant main effects or interactions among different predictors. The item predictor, slide type accounted for 28.5% of the item variation in dwell time for negative pictures. The subject predictors, victimization, PTSD, and mood condition, however, only accounted for 0% of the subject variation in dwell time for negative pictures. Therefore, a significant proportion of variability in preferential dwell time for negative pictures across participants and pictures remains unaccounted for by the predictors used in this study.

Summary. The findings from conditional models revealed that participants dwelled less on negative pictures when these were paired with rape pictures rather than positive pictures, indicating that all women displayed less difficulty disengaging from negative stimuli when presented with trauma-related stimuli. No other predictors accounted for the variability observed across participants and across pictures.

Run count. Compared to the empty means, random subjects model, the better fitting random items and subjects model indicated that there was significant variability in run count for negative pictures, across participants, $-2\Delta LL(\sim 1) = 271.7$, $p < .0001$, and across pictures, $-2\Delta LL(\sim 1) = 413.4$, $p < .0001$, such that 14.5% of the total variation in run count was due to systematic mean differences across participants, 12.27% was due to mean differences across pictures, and the remaining 73.21% was due to participant by picture interaction. Random intercepts for both participants and pictures along with residual variance were retained for subsequent predictor analyses.

Sequential conditional models examining the effects of predictors on run count for negative pictures (see Table 5) indicated that there were no significant main effects or interactions of item or subject predictors. There was zero reduction in the item variation and the subject variation in run count for negative pictures. Thus, the variability in preferential run count for negative pictures across participants and pictures that is unaccounted for by the predictors used in this study.

Summary. The findings from conditional models revealed that the predictors in the model did not predict run count for negative stimuli.

Generalized Linear Mixed Modeling to Examine Changes in the Probability of Fixation on Rape Pictures across Trial Duration

Part three of this study examined whether participants' fixations on the rape picture of the pair of stimuli varied across the five-second trial duration and whether sexual victimization predicted these variations (hypothesis 3). Specifically, it was expected that all women, regardless of their victimization history, would initially display similar likelihood to fixate on the rape picture. However, revictimized women would display progressively less fixations on the rape picture across trial duration whereas women with single victimization experience or no victimization would display faster decline in fixations on the rape picture across trial duration.

The outcome variable for this analysis is a binary variable that records whether the fixation at a time point was on the rape picture or not. A generalized linear mixed model was estimated to account for the binary outcome variable where the assumption of continuous scores and the normality assumption are violated (Hox, 2010). In utilizing this growth modeling, the non-normal outcome variable was transformed into

continuous variable using a logit link function that represents the natural logarithm of odds ratio (i.e., log of the odds of the probability of one) where predictors are combined in a linear combination to predict the link-transformed outcome.

The first step in the analyses was to determine whether there was significant within-cluster interdependence to warrant the use of a multilevel approach. A Pearson's correlation coefficient between binary outcome variable (which indicates whether participants' fixation was on rape picture or not) and time of fixation for each slide type (e.g., rape-positive and rape-negative) was obtained using PROC CORR procedure. Then, models were estimated for rape picture slides using PROC GLIMMIX procedure and Laplace method in SAS. First, an unconditional model with random intercept for persons and slides model that predicts no change in the outcome variable on average was assessed as a baseline model for comparison of fit of subsequent models. Thereafter, fixed effects of predictors (victimization and slide type) as well as fixed and random effects of time were added sequentially and analyzed. In this study, fixations were nested within slides, which were nested within persons, and time was centered such that 0 indicated the start of a trial. Therefore, random effects associated with level-1 fixation time were examined for convergence at level 2 (i.e., slide within person) and level 3 (i.e., person) to assess whether the effect of predictors varies over slides and persons. For each model that includes random slopes for time, random slopes are added in level 2 RANDOM statement first, which if significant, was subsequently added in level 3. The significance of random effects was evaluated using $-2\Delta LL$ tests and information criteria between models with the same fixed effects. The significance of fixed effects was evaluated using Wald test ($p < .05$).

For rape picture comparisons, an unconditional model with random intercept for persons and slides model was estimated first, in which the fixed intercept indicated that the expected logit of participants' fixation being on rape pictures at any occasion across trial duration was 0.12 (i.e., 52.9% probability). The intraclass correlation (ICC) indicated that approximately 0% of the residual variance was due to systematic between-subject differences, 8% was due to systematic between-slide variation, and the remaining 92% represented subject by slide interaction. Computation of 95% confidence intervals for the random variation around each fixed effect indicated that 95% of individual subject means for fixations on rape pictures were expected to fall between 0.51 and 0.55, and 95% of the individual item means for fixations on rape pictures were expected to fall between 0.28 and 0.76.

A fixed linear effect of time and fixed effects of victimization and slide type were added to the model that yielded significant effects. The addition of a random linear slope did not improve the model fit. The fixed linear random intercept model was re-estimated after removing nonsignificant interaction terms, which generated slightly smaller AIC term and comparable BIC term.

The parameters of the best-fitting fixed linear random intercept model (see Table 6) included a fixed intercept that indicated that the expected logit of participants' fixation being on rape pictures at the start of trial was 0.62 (and where all other variables are zero; that is, this was the intercept for rape-positive slide type and non-victims). That is, the probability of participants' fixation being on rape picture at the start of trial is 65%. The fixed linear time slope was significant, $F(1, 22326) = 33.83$, $p < .001$, indicating that the logit of linear rate of change in participants'

fixation being on rape pictures at the start of trial was -0.10. That is, the probability of participants' fixation being on rape picture is 65% at the start of a trial, and the logit of a 1 decreased 0.10 per unit time (see Figure 1).

Table 6

Model Parameters for the Best-fitting Model for Five-second Fixation Data for Rape Picture Comparisons

	Rape Picture Comparisons (Rape-Negative vs. Rape-Positive)		
	Fixed Linear, Random Intercept Model		
Model Effects	Estimate	SE	*p*
Model for the Means			
Intercept	**0.62**	0.05	<.001
Linear	**-0.10**	0.01	<.001
Victimization Group (singly victimized)	-0.05	0.05	0.29
Victimization Group (revictimized)	0.02	0.06	0.69
Slide Type (rape-neg)	**-0.70**	0.06	<.001
Linear*Slide Type (rape-neg)	**0.09**	0.02	<.001
Model for the Variance			
Subject Intercept Variance	0.009	0.007	
Item Intercept Variance	0.23	0.02	
Residual Variance	3.29		
Model Fit			
Number of Parameters	8		
LAPLACE -2LL	32124.74		
LAPLACE AIC	32140.74		
LAPLACE BIC	32164.39		

Note. Time was centered at the start of trial. Bold values are $p < .05$.

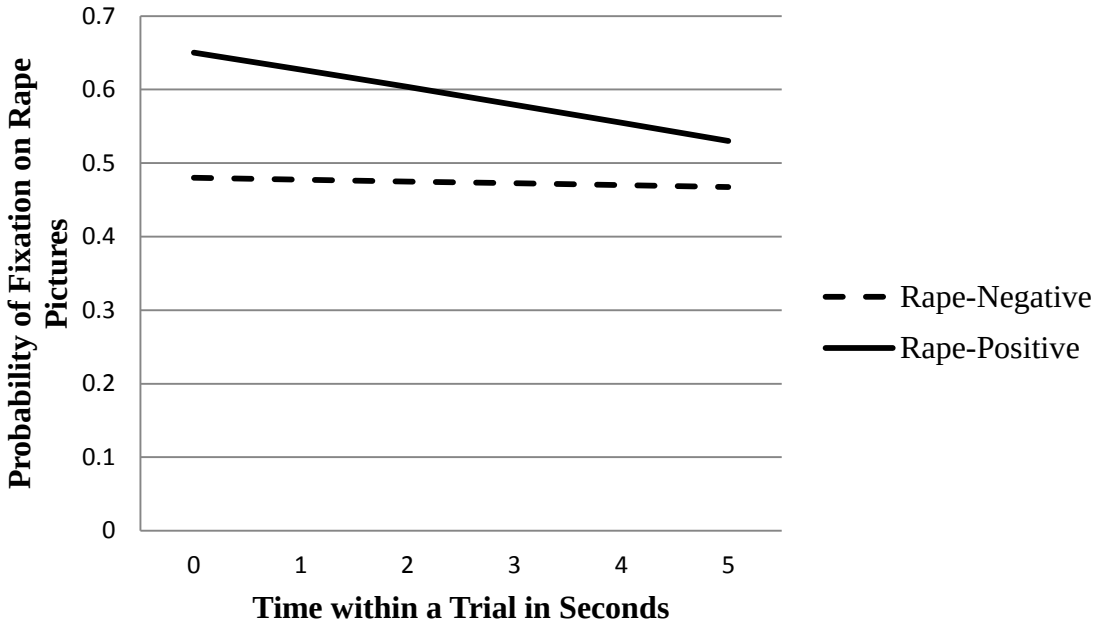

Figure 1. Probability for linear slope of time by slide type interaction for rape picture comparisons.

The effect of victimization was nonsignificant, $p = .33$, indicating that, unlike our prediction, there were no significant differences among participants in the logit of their fixation being on rape pictures across trial duration due to their victimization. We also explored whether slide type predicted differences in the outcome and the results indicated that the effect of slide type was significant, $F(1, 22326) = 138.67$, $p < .001$, such that there were differences among participants in the logit of their fixation being on rape pictures depending on whether rape pictures were paired with positive pictures as opposed to negative pictures. Specifically, for rape-negative trials, as compared to rape-positive trials, the logit of fixation being on rape pictures at the start of a trial was lower by 0.70 per second. That is, at the start of the trial, participants were less likely to fixate on rape pictures when these were paired with negative pictures as opposed to positive pictures.

Further, the significant interaction term between linear slope and slide type indicates that for rape-negative slides, as the trial progresses, slide type has a less negative effect such that the logit of fixation being on the rape picture becomes less negative by 0.09 per second. That is, the probability of participants' fixation for rape pictures was constant across trial duration, when paired with negative pictures.

Summary. Contrary to hypothesis 3, there were no differences in fixations for rape pictures by victimization, indicating that all women, regardless of their victimization history, displayed the same extent of fixation for rape pictures. However, there was a statistical difference for fixation by slide type where participants showed higher fixation probabilities for rape pictures paired with positive pictures than rape pictures with negative pictures, at the start of the trial. As seen in Figure 1, there was

also an interaction effect such that when rape pictures were paired with negative pictures, the probability of participants' fixation for rape pictures was constant across trial duration. When rape pictures were paired with positive pictures, the probability of participants' fixation for rape pictures was high at the start of the trial and the probability of their fixation for rape pictures decreased over trial duration. Together, these results suggest that all women manifested an attentional bias away from the trauma-related stimuli over the course of a rape-positive trial, which was reflective of attentional avoidance of trauma-related stimuli over time.

Chapter 5: Discussion

Overview

Sexual victimization survivors may evidence an increased risk for developing attentional biases to personally salient emotional stimuli such as trauma-related stimuli (Fani et al., 2010; Foa et al., 1991; Pineles et al., 2009). However, the precise nature of these attentional biases among sexual victimization survivors remains unclear, and even less is known about factors that may predict these biases. Prior studies that have drawn inferences about attentional processing in various trauma populations have utilized methods that captured a snapshot of survivors' attention to one stimulus presented at a time. What seems more probable, however, is that people attend to multiple intelligible stimuli at a time, but show preferential attentional allocation to certain stimuli over others. Furthermore, in spite of the proposition that attention may vary moment-to-moment, studies have not used methodology to assess the time course of biased attentional patterns by monitoring continuous eye movements to salient emotional stimuli. Thus, the current study applied an eyetracking methodology in college women where trauma-related stimuli (i.e., "rape pictures" with themes related to sexual victimization) and non-trauma stimuli (i.e., positive pictures and general negative pictures) were presented in pairs for five seconds at a time, to draw accurate conclusions regarding the *preferential* and *varying* nature of attentional bias in female survivors of sexual victimization.

Using an ecologically valid visual task in the form of eyetracking, this study evaluated whether college women reporting sexual victimization manifest specific attentional behavior patterns to trauma-related, rape pictures. Specifically, eyetracking

allowed us to investigate preferential orienting toward trauma-related stimuli by assessing survivors' *first fixation time*, which is the amount of time that elapses following the start of each trial until the first fixation on each picture. We predicted that revictimized women, when compared to singly victimized women and nonvictims, were more likely to fixate on the rape picture first independent of the non-trauma picture of the pair. Next, survivors' *first run dwell time* for rape pictures was assessed from the total duration of fixations made during the first gaze fixation on the rape picture of the pair of stimuli before fixating away from it, to understand their initial attentional engagement to trauma-related stimuli. We predicted that revictimized women, when compared to singly victimized women and nonvictims, were more likely to dwell longer on the rape picture during first fixation independent of the non-trauma picture in the pair. Survivors' average *dwell time* and *run count* for rape pictures were also assessed to determine whether the rape picture of the pair of stimuli would continue to hold survivors' attention, which may be indicative of prolonged engagement to trauma-related stimuli. We predicted that compared to singly victimized women and nonvictims, survivors would be preoccupied with the rape picture by dwelling longer on it and frequently returning to it independent of the non-trauma picture in the pair. Exploratory analyses also investigated survivors' first fixation time, first run dwell time, average dwell time, and run count for other emotional, but non-trauma, stimuli such as positive and general negative pictures. The associations between specific attentional behavior patterns and PTSD symptomatology in survivors were also examined to determine whether PTSD is one factor that may predict sexually victimized women's disruptions in attention to emotional stimuli. We

also expected that survivors higher in PTSD symptoms would display similar attentional patterns when compared to survivors lower in PTSD symptoms. Finally, the current study also explored whether attentional patterns toward the rape picture changes over time by capturing the probability of survivors' fixation being on the rape picture across trial duration. We expected that sexually victimized women would display show progressively less fixations on trauma-related stimuli over time. The major conclusions from this study are discussed as follows.

Do Sexually Victimized Women Display Attentional Biases for Rape Pictures?

Contrary to expectations, sexually victimized women (those with revictimization experiences or higher PTSD symptoms) did not exhibit the predicted attentional deployment patterns for rape pictures. In other words, sexually victimized women did not show faster preferential orientation of their gaze toward trauma-related stimuli. They also did not show a heightened tendency to look longer at trauma-related stimuli when compared to non-victimized women. These findings were irrespective of survivors' revictimization status and PTSD symptoms.

Although contradicting prior findings among general trauma populations, a few recent studies have yielded similar results. In Fani et al.'s dot-probe study (2010), adult survivors of childhood sexual, physical, or emotional abuse showed an attentional bias toward happy faces, relative to neutral faces, but showed no attentional bias toward or away from threatening faces. The combat veterans in Kimble et al.'s sample who were higher in PTSD symptoms were statistically indistinguishable from those lower in PTSD symptoms with regard to attentional biases for trauma-related stimuli assessed using an eyetracking task.

As the absence of any attentional biases for rape pictures is unexpected, the validity of this null finding should be considered. First, we used rape pictures that did not receive affective valence and arousal ratings. It is possible that these unstandardized rape pictures were not perceived as sufficiently threatening by survivors to produce the expected pattern of results. It may be that these trauma-related stimuli may not have readily activated survivors' trauma-related fear networks to capture and hold attention. Another related explanation is the ambiguous nature of the rape pictures used. In fact, it is not clear whether some of the rape pictures resembled sexual victimization, physical violence, or atypical sexual acts, and this lack of clarity may have elicited similar attentional responses from both survivors and nonvictims. Evidence in support of this suggests that certain attentional patterns may not be manifested with use of more ambiguous threatening stimuli (Koster, Crombez, Verschuere, Van Damme, & Wiersema, 2006). Furthermore, our findings may represent a generalized response to the rape pictures in all participants, such as was observed in Freeman and Beck's study (2000), perhaps due to the emotional relevance of sexuality to undergraduate women. Although we had ten undergraduate students (non-participants) rate whether the rape pictures were related to sexual violence or general aggression, these picture ratings were performed by relatively healthy students. It is likely that these pictures are conceptualized differently by students with multiple sexual victimization experiences and higher PTSD levels. Therefore, material that mapped more closely to survivors' idiosyncratic notions of threat might show more differential effects. Another explanation may be that there was a strong competition between attention towards different emotional stimuli. Studies have

shown that preferential cognitive processing of threatening stimuli is virtually absent under conditions of high attention-demanding tasks (Pessoa, McKenna, Gutierrez, & Ungerleider, 2002), such as when two emotional pictures are presented simultaneously. It is also possible that choosing college students as our sample may have attenuated group differences. Use of a more functionally impaired clinical sample of survivors as opposed to an undergraduate sample may demonstrate greater attentional biases for trauma-related stimuli. Although the current findings warrant replication, they suggest that survivors and nonvictims in this sample show similar abilities in detecting high value, trauma-specific threat in their environment, assessing the relevance of such stimuli to their current goal (i.e., an experimental task to rate pleasantness of the just-viewed picture), and disengaging from them without showing exaggerated responses.

Although victimization history and PTSD symptomatology were not significant predictors of attentional biases for rape pictures, the women in the study did show longer first run dwell time and longer dwell time on average for rape pictures when these were paired with positive pictures than generally negative ones. This suggests that, once fixated, trauma-related stimuli may be more prone to receive gaze fixations and hold people's attention, when these were paired with affectively incongruent positive stimuli than affectively congruent general negative stimuli. Other studies that have also concurrently presented emotional stimuli have indicated that affectively incongruent stimuli (i.e., a positive stimulus embedded in a sequence of negative stimuli) elicit substantially greater brain responses (e.g., P300) than affectively congruent (i.e., all negative or all positive) stimuli (e.g., Crites, Cacioppo,

Gardner, & Berntson, 1995), suggesting that greater attentional processing may be involved in rape-positive (incongruent) trials than rape-negative (congruent) trials. Moreover, the greater initial attentional engagement and prolonged attentional engagement in rape pictures in incongruent trials could be the consequence of differences in valence and arousal level between trauma-related and positive stimuli. Indeed, there is substantial empirical literature that postulates that stimuli automatically evaluated as negative are more likely to be attended to than those evaluated as pleasant or positive (Pratto & John, 1991), with stronger effects observed for more extreme negative stimuli than milder ones (Mogg et al., 2000; Schimmack, 2005). Additionally, several studies have reported that highly relevant and arousing stimuli capture greater attention (Bradley, Codispoti, Cuthbert, & Lang, 2001; Lang, Greenwald, Bradley, & Hamm, 1993). Accordingly, perhaps the women in the current sample perceived the rape pictures as more arousing than positive stimuli, and showed greater attention to the rape pictures when these were competing with positive pictures. Similarly-valenced rape and negative pictures, however, may not have differed in the level of arousal as much as rape and positive pictures. Thus, the present results suggest that attentional bias in the form of longer first run dwell time and overall dwell time appears to be sensitive to not only the emotional properties (i.e., valence and arousal) of the trauma-related stimulus, but also to the emotional context in which this stimulus is presented.

Do Sexually Victimized Women Display Attentional Biases to Other Emotional Visual Stimuli?

Prior research suggests that attentional biases are not only evidenced for trauma-related stimuli, but also for other emotional stimuli, in various trauma populations such as physical and emotional abuse in childhood (Fani et al., 2010; Gibb et al., 2009). Although not part of the primary hypotheses, the current study examined if this held true for sexually victimized women by detecting their biased attentional processing of positive pictures and general negative pictures.

No significant differences emerged in participants' attentional patterns for general negative pictures, indicating that survivors in the current sample, irrespective of their PTSD symptom levels, did not show facilitated attention or prolonged engagement toward any negative (trauma-related or general negative) stimuli in the eyetracking task. Although sexual victimization experiences across the lifespan may have compromised survivors' ability to recognize, understand, and differentiate emotional information (Polusny, Dickinson, Murdoch, & Thuras, 2008), this did not seem to be the case here, given that survivors and non-victimized women obtained similar results for both rape pictures and general negative pictures. However, similar to the findings regarding rape pictures, participants were more likely to dwell on general negative pictures for longer time on average, when general negative pictures were paired with positive pictures than rape pictures. Thus, once fixated, general negative stimuli may be more prone to receive gaze fixations and hold people's attention, when these were paired with affectively incongruent positive stimuli. As noted previously, affective incongruency of negative-positive trials may have produced these results.

Although there were no overall differences among participants, there was significant variability within sexually victimized women with regard to their dwell time for positive pictures. Specifically, survivors higher in PTSD symptoms (intrusions, avoidance/numbing, and hyperarousal symptoms) were less likely to dwell on positive pictures independent of the contrasting picture in the pair, compared to survivors with low levels of PTSD symptoms. This finding is consistent with Gibb et al.'s dot-probe study (2009) that reported that adult survivors of childhood victimization (including sexual victimization) displayed a tendency to show attentional avoidance of happy faces. Together, these studies indicate that victimization experiences may be related to biases for other emotional information. One explanation for this finding may be that high PTSD survivors may expend so much cognitive, emotional, and behavioral effort attempting to manage their intrusion and hypervigilance symptoms that they exhaust or deplete their emotional resources, which leads to diminished ability to attend to and use positive information and experience positive emotions (Foa, Zinbarg, & Rothbaum, 1992). Relatedly, it appears that survivors with high levels of PTSD symptoms may experience some difficulties up-regulating their positive emotions as evidenced by their diminished interest in expanding their attention toward positive aspects in their environment. However, preferential attention toward pleasant stimuli in the presence of unpleasant stimuli has been shown to elicit positive emotional state (i.e., up-regulate positive affect) and facilitate further adaptive coping (Joormann & Gotlib, 2007; Wadlinger & Isaacowitz, 2008). This reduced attention to positive stimuli among survivors higher in PTSD symptoms, however, may impede the process of their adaptive emotion regulation.

This finding suggests that high levels of PTSD symptoms in survivors may also be related to biased processing of emotional stimuli other than trauma-related stimuli.

Does Attentional Bias to Rape Pictures Vary Across Trial Duration and Does Sexual Victimization Predict these Variations?

Relatively few studies have monitored continuous eye movements while participants viewed pairs of pictures in order to understand the time course of attention deployment (e.g., Nummenmaa, Hyönä, & Calvo, 2006). Results from these studies have shown that the nature of attentional bias may vary according to the stage of information processing. Early stages, for example, reveal processes such as fast detection of or engagement on a stimulus of interest whereas later stages manifest more strategic processes such as delayed disengagement and attentional avoidance of the stimulus (Cisler & Koster, 2010). In this study, we predicted that all women, regardless of their victimization history, would initially display similar likelihood to fixate on the rape picture. However, sexually revictimized women would display progressively less fixations on the rape picture across trial duration whereas women with single victimization experience and no victimization would display faster decline in fixations on the rape picture across trial duration.

Results suggest that participants showed changes in fixation patterns for rape pictures across rape picture trials, but that sexual victimization history did not predict these biases in eye movements. At the start of trial, participants were more likely to fixate on rape pictures that were paired with positive pictures than negative pictures. This finding is partially consistent with predictions and reflects participants' bias in early attentional engagement toward rape pictures particularly amidst affectively

incongruent (i.e., positive) stimuli. Further, the fixations on the rape pictures remained the same for trials where these were paired with negative pictures. In trials where the rape pictures were paired with positive pictures, however, participants' fixations on the rape pictures steadily decreased as time progressed. This reflects participants' attentional avoidance of rape pictures when affectively different stimuli were available. In essence, all women in the study displayed an overall attentional bias away from rape pictures (i.e., toward positive pictures) across trial duration in response to rape-positive pairings. Previous eye movement studies have demonstrated a similar effect of attentional avoidance of threatening stimuli at long stimulus durations among different anxious populations (Calvo & Avero, 2005; Pflugshaupt et al., 2005; Rohner, 2002). However, there was no evidence from the present study that sexual victimization has an independent influence on attentional avoidance of rape pictures in the form of gaze fixations. One reason for this lack of finding may be that we used a relatively high functioning group of participants in our sample—college women—that may not have permitted the detection of between group differences. Furthermore, we cannot conclude whether attentional avoidance of rape pictures is necessarily a maladaptive phenomenon, given that all participants exhibited this and we did not examine whether specific attentional behavior patterns predicted emotional problems. It may be that the participants did not perceive there was a "good" choice in rape-negative slides and showed no change in fixations on the rape picture across the time of the trial. In the rape-positive condition, participants may have perceived a positive alternative to the rape picture, thus increasing the likelihood of looking away from the rape picture across the time of the trial.

Limitations

Interpretation of these results should be considered in the light of several important limitations. One of the limitations is the use of unstandardized rape pictures that were obtained from the public domain. Although undergraduate students rated these rape pictures as having a sexual victimization theme as opposed to general aggression, these were not matched with the general negative and positive IAPS pictures in terms of affective valence and arousal ratings, complexity value, luminance level, and color saturation. An advantage of this study, however, is that we used interpersonal scenes that are shown to have greater emotional arousal than emotional faces or words (Bradley et al., 2003) that were used in prior studies assessing attentional biases among sexual victimization survivors. However, future research should develop a database of standardized emotional interpersonal scenes that are closely representative of survivors' experiences, rated as salient by survivors, and elicit negative emotions, for *in vivo* assessment of emotional attentional bias.

Next, because this study included only Midwestern college students, the generalizability of findings to non-university and clinical populations is not known. For instance, participants reporting sexual victimization experiences and high levels of PTSD were likely functioning at a higher level than a clinical sample. Given their enrollment in school, they may have downplayed the extent of their victimization experiences and the extent to which any symptoms impacted on their functioning abilities. It is possible that different attentional patterns may be manifested, for example, among clinical samples with more severe PTSD symptomatology or PTSD diagnosis. Therefore, although college women are an at-risk group for sexual

victimization (Messman-Moore & Brown, 2006), further studies are necessary to extend this body of research to other community and clinical samples of sexual victimization survivors. Some caution is also warranted in interpreting the lack of findings because of the relatively small and high functioning sample in this study, which may have prevented detection of meaningful differences and clinically important effects. Further studies are necessary to determine whether these findings replicate in larger samples that include survivors from more varied backgrounds.

Another important limitation is that although the women classified as nonvictims reported that they were not sexually abused during childhood/adolescence or adulthood, they may have experienced other interpersonal traumas as children or as adults (e.g., physical abuse). Further, we did not rule out or account for presence of other traumas experienced by sexual victimization survivors in the sample. We also did not assess the PTSD symptoms uniquely to experiences of sexual victimization, making it possible that survivors may have reported symptoms that pertain to other traumatic experiences. Studies contrasting survivors with different victimization experiences have suggested that they differ in their early experiences of emotion socialization as well as their capacities to recognize, express, and understand emotions (Pollak et al., 2000). Moreover, drawing on Foa and Kozak's theory, it is assumed that survivors develop unique fear structures or schemas based on their traumatic experience that may then differentially influence aspects of their attention. For example, a sexually abused individual with physical abuse experience may attend more to both rape pictures as well as pictures depicting general aggression such as a threatening face, whereas another individual with only sexual abuse experience may

preferentially attend only to rape pictures. Therefore, given how different types of victimization tend to co-occur, we cannot rule out the influence of other interpersonal traumas or victimizations among sexual victimization survivors, which may have biased their attentional patterns.

Finally, in addition to assessing other trauma experiences, future research might measure the severity and frequency of sexual victimization to determine their possible effects on the emergence of attentional bias. Moreover, the current study utilized participants regardless of whether they met the cut-off for a PTSD diagnosis. Although mild levels of anxiety are sufficient for triggering attentional bias (Bar-Haim et al., 2007), future studies should also examine PTSD symptom clusters in relationship to attentional biases for trauma-related stimuli in survivors, comparing those with PTSD diagnosis versus sub-threshold symptoms.

Research and Clinical Implications of This Study

Attentional biases to trauma-related stimuli have been suggested as a mechanism that moderates emotion dysregulation among sexual victimization survivors, yet studies using strong methodologies are scarce. The larger study from which the present data are derived is perhaps the first study to examine sexual victimization survivors' attentional deployment in a continuous fashion using eyetracking technology. The results from the current study highlight that sexual victimization could uniquely influence people's attentional processing of certain emotional information, especially in the presence of high levels of PTSD symptoms. Specifically, survivors in the current sample exhibited attentional avoidance of positive stimuli, but, unlike several previous studies, did not show any attentional

biases for trauma-related stimuli. This finding emphasizes that attention in sexual victimization survivors with higher PTSD symptoms may involve biased processing of emotional stimuli other than those related to their trauma. This finding is important for sexual victimization survivors given the strong association of victimization with emotion regulation difficulties (Kim & Cicchetti, 2009; Walsh, Galea, & Koenen, 2012) and the increasing recognition of emotion dysregulation as a mechanism that accounts for linkages between early victimization to later revictimization and psychopathology (Cloitre, Miranda, Stovall-McClough, & Han, 2005; Walsh, DiLillo, & Messman-Moore, 2012). The connection between survivors' selective inattention to pleasant information and their emotion dysregulation, as well as its contribution to the development and maintenance of PTSD symptoms need further examination.

The current study suggests that eyetracking can be a valuable method to draw accurate conclusions regarding unique visual attentional patterns in sexual victimization survivors. Although eyetracking does not directly measure attention, it tracks eye movements that are the best proxy measures of visual attention. Moreover, the eyetracking method offers several advantages compared to other techniques where inferences must be made based on participants' performance on secondary tasks. By contrast, eyetracking allows measurement of different attentional patterns, by capturing continuous overt eye movements when two pictures were presented simultaneously. Accordingly, the attentional processes we found in our study may be more characteristic of sexually victimized women, and should be replicated in further studies using a similar advanced methodology.

Findings from this study also have important practical therapeutic implications for clinicians developing and implementing efficacious treatments for sexual victimization survivors with PTSD symptomatology. Sexually victimized women who experienced higher levels of PTSD symptomatology, including intrusions, avoidance/numbing, and hyperarousal symptoms, displayed greater difficulties shifting attention to pleasant aspects in the environment when compared to those with lower levels of PTSD symptomatology. Selectively attending to certain affective stimuli while actively disregarding others is one important mechanism through which individuals may regulate their emotions (Gross, 1998). For example, exhibiting attentional bias favoring emotionally positive information has been linked to effective emotion regulation (Wadlinger & Isaacowitz, 2008). It is likely that survivors with high PTSD may become overinvested on managing their intrusions and hyperarousal symptoms, which may then deplete their emotion regulation resources and result in attempts to suppress internal or external experience of any emotions, including positive ones. Therefore, survivors with high PTSD and those who are predisposed to PTSD should not only be taught effective emotion regulation strategies to decrease negative affect without getting overwhelmed, but they should also be taught adaptive strategies to increase positive affect, such as by encouraging them to attend to positive information in a situation or in their environment. In this regard, sexually victimized women may also benefit from being taught effective reappraisal techniques for emotion regulation, such as, for example, teaching them to reappraise the events or stimuli with the goals to reduce negative affectivity and to redirect attention and

energy to perception of more positive aspects and the present (Cloitre, Cohen, & Koenen, 2006).

Our findings, in addition to recent work on attention bias modification (attentional retraining) as an emerging intervention for anxiety disorders (see Bar-Haim, 2010, for a review), yield the hope of potentially treating sexually victimized women with PTSD by modifying their attentional deployment in a laboratory context. Current data also suggest the use of attentional bias modification as an adjunct to traditional trauma-focused interventions, especially for those with higher PTSD symptomatology or those who are predisposed to PTSD. Emerging research among patients with PTSD suggests that modifying attentional bias toward and away from trauma-related stimuli could regulate and normalize patients' attentional control and reduce risk for posttraumatic stress symptoms (Wald et al., 2011). Given that sexual victimization poses significant risk to develop subsequent PTSD, the current results highlight particular attentional patterns that could be investigated as an important treatment focus for survivors. Typically, attentional retraining has attempted to train participants to shift attention away from threatening stimuli, but our finding that higher PTSD symptom levels in survivors were related to shorter dwell time for positive stimuli indicate that it is important to identify unique pre-existing attentional patterns and tailor training to alter these, which in our sample of survivors involves attentional bias away from positive stimuli. Experimentally training individuals to selectively attend to positive information has been found to attenuate their experience of negative emotions under stress (Wadlinger & Isaacowitz, 2008). Individualizing interventions to modify maladaptive attentional patterns also has important

implications for predicting treatment outcomes as well as relapse post trauma-focused treatment (Waters, Mogg, & Bradley, 2012). Taken together, it will be an interesting and important research and clinical avenue to explore whether reduction of these attentional biases by teaching emotion regulation skills as well as attentional retraining, may reduce symptoms of PTSD and prevent later PTSD in sexually victimized women.

Conclusion

In conclusion, the present study provides initial evidence for certain types of attentional biases for emotional stimuli other than trauma-related stimuli in sexually victimized college women. Specifically, the findings suggest that survivors may exhibit an attentional bias away from positive stimuli, especially if they experience higher symptoms associated with PTSD. This finding partly replicated evidence from adult survivors of childhood victimization (Gibb et al., 2009). A history of sexual victimization alone however did not predict any attentional biases in our sample. The results suggest that future trauma-focused interventions should include attempts to improve survivors' emotion regulation skills as well as to retrain survivors' attention by targeting specific attentional patterns, not only for trauma-related stimuli, but also for other emotional stimuli.

Chapter 6: References

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Appendices

Appendix A

Informed Consent

University of Nebraska Lincoln

DEPARTMENT OF PSYCHOLOGY

IRB# 2009059626FB
Date Approved: 03/02/2010
Valid Until: 03/28/2011

Informed Consent Form

Emotions, cognitions, and early life experiences

Purpose of Project

You have been invited to participate in a research study investigating how prior life events, emotional experiences, and cognitions may impact current psychological functioning and coping behaviors. To participate in this study, you must be female and currently enrolled in a Psychology course that offers credit for research participation.

Procedures

If you agree to participate, this project will take approximately 1.5 hours to complete. You will be asked to complete questionnaires about adverse life events (including sexual victimization experiences occurring during childhood, adolescence, or adulthood), emotions, cognitions, current symptoms of psychological distress, and coping behaviors. You also will view a brief film clip that is either neutral or potentially upsetting. Finally, you will view a series of still pictures that depict positive and negative images, some of which show acts of aggression. During the picture viewing task you will wear a lightweight headset that monitors your eye movements.

Risks and/or Discomforts

It is possible that you might experience some emotional distress when completing this study. This distress could come from answering questions about adverse child or adult experiences. In addition, you may be asked to watch a brief film clip that is designed to cause you to feel upset for a short period of time. Finally, some of the images you will be asked to view may cause you to feel uncomfortable. Should you feel uncomfortable during any part of the study, you may refuse to answer the questions or stop at any time without penalty. If you wish to stop the study at any time, you may do so without harming your relationship with the researchers or with the university. In the event of problems resulting from participation in this study, psychological treatment is available on a sliding scale fee at the UNL Psychological Consultation Center, telephone (402) 472-2351.

Benefits

Although there are no known direct benefits to study participants, this project may provide researchers with a better understanding of how prior life experiences, emotions, and cognitions influence overall psychological functioning and coping.

Confidentiality

Any identifying information (e.g., names, UNL student identification numbers) obtained during this study will be protected and will not be disclosed unless required by law or regulation. The responses you provide will be identified only by a randomly assigned study identification number and there will be no linkage between your name and the data you provide.

Participant Initials ____

238 Burnett Hall / P.O. Box 880308 / Lincoln, NE 68588-0308 / (402) 472-3721 / Fax (402) 472-4637

The data will be stored in a locked cabinet in the principal investigator's office and will be kept for five years after the study is complete. Only the researchers listed at the bottom of this form and study personnel will have access to your data. The knowledge gained from this study may be published in scientific journals or presented at scientific meetings, but it will be reported only as aggregate data. Thus, your individual responses will not be identified.

Compensation

You will receive three units of research credit for participating in this study. Credit will be awarded after the completion of the study. If you choose not to participate in this study, you should consult your instructor about alternate ways to earn credit.

Opportunity to Ask Questions

You may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study. Yu may call the investigator at any time, Kate Walsh, M.A. at (402) 613-1090 or her advisor, David DiLillo, Ph.D. at (402) 472-3297 Please contact the investigator:

- if you want to voice concerns or complaints about the research;
- in the event of a research related injury.

Please contact the University of Nebraska-Lincoln Institutional Review Board at (402) 472-6965 for the following reasons:

- you wish to talk to someone other than the research staff to obtain answers to questions about your rights as a research participant;
- to voice concerns or complaints about the research;
- to provide input concerning the research process;
- in the event the study staff could not be reached.

Freedom to Withdraw

You are free to decide not to participate in this study or to withdraw at any time without harming your relationship with the researchers or the University of Nebraska. Your decision will not result in any loss or benefits to which you are otherwise entitled. You will receive all course credits should you choose to withdraw from the study.

Consent to Participate

You are voluntarily making a decision whether or not to participate in this research study. Your signature indicates that you have decided to participate in the study after reading the consent form and having opportunities to ask questions about the information presented. You will be given a copy of this consent form to keep.

_____ _____

Signature of Participant Date

_____ _____

Signature of Researcher Date

Appendix B

Questionnaires

Demographic Questionnaire

***Instructions*:** Thank you for agreeing to participate in this study. You will be answering several questions on the computer, many of which may seem repetitive, but please try to read each question carefully. The first set of questions will ask about your background. Please let the research assistant know if you have questions!

1. What is your current age? _____
2. Have you ever been married or are you currently living with someone?
   - (1) Never Married
   - (2) Married
   - (3) Cohabitating
   - (4) Divorced or separated
   - (5) Widowed
3. What is your religious affiliation, if any?
   - (1) Protestant (Baptist, Methodist, Lutheran, Church of Christ, etc.)
   - (2) Catholic
   - (3) Jewish
   - (4) Non-affiliated
   - (5) Other
4. What is your ethnicity?
   - (1) Caucasian/Euro-American
   - (2) African American
   - (3) Hispanic/Latino American
   - (4) Asian American
   - (5) Native American
   - (6) Hawaiian Islander
   - (7) Other

   If other, please explain_____
5. What is your sexual orientation?

Completely Homosexual		Bisexual		Completely Heterosexual
1	2	3	4	5

6. Are you currently a full time student?
   - (0) No
   - (1) Yes
7. What is your current household income?
   - (1) Less than $10,000
   - (2) Between $10,000 - $20,000
   - (3) Between $21,000 - $30,000
   - (4) Between $31,000 - $40,000
   - (5) Between $41,000 - $50,000
   - (6) Between $51,000 - $60,000
   - (7) Between $61,000 - $70,000
   - (8) Between $71,000 - $80,000
   - (9) Between $81,000 - $90,000
   - (10) Between $91,000- $100,000
   - (11) Between $100,000-$150,000
   - (12) Above $150,000
8. What was the average yearly household income in your family as you were growing up?
   - (1) Less than $10,000
   - (2) Between $10,000 - $20,000
   - (3) Between $21,000 - $30,000
   - (4) Between $31,000 - $40,000
   - (5) Between $41,000 - $50,000
   - (6) Between $51,000 - $60,000
   - (7) Between $61,000 - $70,000
   - (8) Between $71,000 - $80,000
   - (9) Between $81,000 - $90,000
   - (10) Between $91,000- $100,000
   - (11) Between $100,000-$150,000
   - (12) Above $150,000
9. Using the scale below, what was the highest level of education completed by your father? (By father we mean the main male caregiver that you lived with as a child.) _____
   - (1) Less than high school
   - (2) Finished high school or obtained GED
   - (3) Some college

(4) Two years of college
(5) Associate of Arts Degree
(6) M.F.A. Degree or equivalent
(7) BA or BS Degree
(8) Some graduate education
(9) Professional Degree (e.g. law)
(10) Master's Degree
(11) M.D. / Ph.D. / Ed.D.

10. Using the scale below, what was the highest level of education completed by your mother? (By mother we mean the main female caregiver that you lived with as a child.) _____

(1) Less than high school
(2) Finished high school or obtained GED
(3) Some college
(4) Two years of college
(5) Associate of Arts Degree
(6) M.F.A. Degree or equivalent
(7) BA or BS Degree
(8) Some graduate education
(9) Professional Degree (e.g. law)
(10) Master's Degree
(11) M.D. / Ph.D. / Ed.D.

11. Using the scale below, what was your father's occupation as you were growing up? _____

(1) Unemployed, dependent upon public assistance
(2) Farm laborer or Service Worker (e.g., dishwasher, car wash attendant, private house cleaner)
(3) Unskilled Workers (e.g., bartender, garbage collectors, construction worker)
(4) Semiskilled Workers (e.g., animal caretakers, childcare providers, barbers/hairdressers, bus driver, railroad conductors, meat cutters)
(5) Skilled workers (e.g., carpenters, electrician, firefighters, mail handlers, LPNs, railroad engineers, police person or detectives)
(6) Small Business Owner Skilled Service Workers (e.g., auctioneers, bank tellers, dental assistants, health trainers)
(7) Technicians or Semiprofessionals (e.g., advertising agent, air traffic controller, dental hygienists, opticians, photographers, secretaries)
(8) Professionals/Administrators (e.g., accountants, clergymen, RNs, pharmacists, secondary school teachers, pilots)
(9) Higher Executive/M.D or Ph.D. (e.g., astronomer, architect, civil engineers, attorneys, psychologists, college or university professors)

12. Using the scale below, what was your mother's occupation as you were growing up? _____

(1) Unemployed, dependent upon public assistance
(2) Farm laborer or Service Worker (e.g., dishwasher, car wash attendant, private house cleaner)
(3) Unskilled Workers (e.g., bartender, garbage collectors, construction worker)
(4) Semiskilled Workers (e.g., animal caretakers, childcare providers, barbers/hairdressers, bus driver, railroad conductors, meat cutters)
(5) Skilled workers (e.g., carpenters, electrician, firefighters, mail handlers, LPNs, railroad engineers, police person or detectives)
(6) Small Business Owner Skilled Service Workers (e.g., auctioneers, bank tellers, dental assistants, health trainers)
(7) Technicians or Semiprofessionals (e.g., advertising agent, air traffic controller, dental hygienists, opticians, photographers, secretaries)
(8) Professionals/Administrators (e.g., accountants, clergymen, RNs, pharmacists, secondary school teachers, pilots)
(9) Higher Executive/M.D or Ph.D. (e.g., astronomer, architect, civil engineers, attorneys, psychologists, college or university professors)

12. Before you were 18, did you ever live with anyone who abused alcohol on a regular basis?

(0) No
(1) Yes

13. Before you were 18, did you ever live with anyone who abused other drugs like marijuana, cocaine, prescription medication, or other substances?
(0) No
(1) Yes

14. Before you were 18, did anyone in your household have a mental illness such as depression, severe anxiety, schizophrenia, manic-depression, or any other psychiatric illness?
(0) No
(1) Yes

15. Before you were 18, were your parents ever separated or divorced?
(0) No
(1) Yes

16. Before you were 18, was anyone you lived with ever put in jail for any reason?
(0) No
(1) Yes

17. Did either of your parents die before you reached the age of 18?
(0) No
(1) Yes

18. Were you ever in a life-threatening accident of any kind before you reached the age of 18?
(0) No
(1) Yes

19. Were you ever in a life-threatening tornado, hurricane, fire, or other natural disaster before you reached the age of 18?
(0) No
(1) Yes

20. Before you reached the age of 18, were you ever the victim of a crime that resulted in physical injury or that had the potential to be life-threatening?
(0) No
(1) Yes

21. To the best of your knowledge, were your parents or immediate caregivers ever investigated because of a charge of child abuse or neglect?
(0) No
(1) Yes

22. Were you ever removed from your home because of abuse, neglect, or because your parents financially unable to care for you?
(0) No, I was never removed from the home.
(1) Yes, once.
(2) Yes, two to five times.
(3) Yes, five to ten times.

23. What was the date of the first day of your last menstrual period? _____/_____/_____

Childhood Trauma Questionnaire

***Instructions*:** The following questions ask about some of your experiences growing up as a child and teenager. For each statement, please select the number that best describes your experiences before the age of 18. Even though some of the questions are very personal, please try to answer as honestly as possible.

For each item, the response options are as follows:

1 = never true
2 = rarely true
3 = sometimes true
4 = often true
5 = very often true

1	I didn't have enough to eat.
2	I knew there was someone to take care of me and protect me.
3	People in my family called me things like "stupid," "lazy," or "ugly."
4	My parents were too drunk or high to take care of the family.
5	There was someone in my family who helped me feel important or special.
6	I had to wear dirty clothes.
7	I felt loved.
8	I thought that my parents wished I had never been born.
9	I got hit so hard by someone in my family that I had to see a doctor or go to the hospital.
10	There was nothing I wanted to change about my family.
11	People in my family hit me so hard that it left me with bruises or marks.
12	I was punished with a belt, a board, a cord, or some other hard object.
13	People in my family looked out for each other.
14	People in my family said hurtful or insulting things to me.
15	I believe that I was physically abused.
16	I had the perfect childhood.
17	I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor.
18	I felt that someone in my family hated me.
19	People in my family felt close to each other.
20	Someone tried to touch me in a sexual way, or tried to make me touch them.
21	Someone threatened to hurt me or tell lies about me unless I did something sexual with them.
22	I had the best family in the world.
23	Someone tried to make me do sexual things or watch sexual things.
24	Someone molested me.
25	I believe I was emotionally abused.
26	There was someone to take me to the doctor if I needed it.
27	I believe that I was sexually abused.
28	My family was a source of strength and support.

Computer Assisted Maltreatment Inventory-Sexual Abuse Screener

It is now commonly known that many people have sexual experiences during childhood or adolescence. These experiences may occur with other children, adolescents, or adults and can include a wide range of behaviors including witnessing sexual activity, touching or being touched in a sexual way, and sexual intercourse.

In this section we would like to ask you about some of the sexual experiences you may have had before you turned 18. First, read through the list of sexual experiences below. Then, answer the following three questions.

- **Someone intentionally exposed his or her genitals to you or masturbated in front of you.**
- **Someone kissed, touched, or fondled your body in a sexual way or you touched or fondled them.**
- **Someone attempted to have sexual intercourse with you (oral, anal, or vaginal).**
- **You and another person actually had sexual intercourse (oral, anal, or vaginal).**

1. Before you were 18, did ANY of the above ever happen with anyone against your will or when you did not want it to happen?
   (1) Yes
   (2) No

2. Before you were 18, did ANY of the above ever happen with an immediate family member or other relative? (Please EXCLUDE any voluntary sexual play that may have occurred with a similar age peer—for example "playing doctor.")
   (1) Yes
   (2) No

3. Before you were 18, did ANY of the above ever happen with anyone who was more than 5 years older than you? (Please EXCLUDE any VOLUNTARY activities that occurred with a dating partner.)
   (1) Yes
   (2) No

Modified Sexual Experiences Survey

***Instructions*:** The following questions will ask about sexual experiences you have had since you turned 18. Please report experiences you have had EVEN IF they were NOT reported to police OR discussed with family or friends. Please report experiences EVEN IF you do not feel they were very forceful OR if they happened with boyfriends, friends, or husbands.	
1	Have you ever had sexual intercourse? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
2	Have you ever had a man misinterpret the level of sexual intimacy you desired? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
3	Have you ever had sex with a man when you really didn't want to because he threatened to end the relationship? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
4	Have you given into sex play (fondling, kissing, or petting, but not intercourse) when you didn't want to because you were overwhelmed by a man's continual arguments and pressure? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
5	Have you had sex play (fondling, kissing, or petting, but not intercourse) because a man used his position of authority (boss, teacher, camp couselor, supervisor) to make you? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
6	Have you had sex play (fondling, kissing, or petting, but not intercourse) when you didn't want to because a man threatened or used some degree of physical force (twisting your arm, holding you down) to make you? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
7	Have you given into oral sex (giving a blow job or going down, but not intercourse) when you didn't want to because you were overwhelmed by a man's continual arguments and pressure? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
8	Have you had oral sex (giving a blow job, going down, but not intercourse) when you didn't want to because a man used his position of authority (boss, teacher, camp counselor, supervisor) to make you? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
9	Have you had oral sex (giving a blow job or going down, but not intercourse) when you didn't want to because you were incapable of giving consent or resisting due to alcohol or drugs? 0 = No 1 = Yes

	• On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
10	Have you had oral sex (giving a blow job or going down, but not intercourse) when you didn't want to because a man threatened or used some degree of physical force (twisting your arm, holding you down, etc) to make you? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
11	Have you had a man attempt sexual intercourse (get on top of you, attempt to insert his penis) when you didn't want to by threatening or using some degree of physical force (twisting your arm, holding you down), but for some reason intercourse did not occur? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
12	Have you had a man attempt sexual intercourse (get on top of you, attempt to insert his penis) when you didn't want to because you were incapable of giving consent or resisting due to alcohol or drugs, but for some reason intercourse did not occur? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
13	Have you given into sexual intercourse when you didn't want to because you were overwhelmed by a man's continual arguments and pressure? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
14	Have you had sexual intercourse when you didn't want to because a man used his position of authority (boss, teacher, camp counselor, supervisor) to make you? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
15	Have you had sexual intercourse when you didn't want to because you were incapable of giving consent or resisting due to alcohol or drugs? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
16	Have you had sexual intercourse when you didn't want to because a man threatened or used some degree of physical force (twisting your arm, holding you down) to make you? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
17	Have you had sex acts (anal intercourse, vaginal or anal penetration by fingers or objects other than the penis) when you didn't want to because you were incapable of giving consent or resisting due to alcohol or drugs? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?
18	Have you had sex acts (anal intercourse, vaginal or anal penetration by fingers or objects other than the penis) when you didn't want to because a man threatened or used some degree of physical force (twisting your arm, holding you down) to make you? 0 = No 1 = Yes • On how many different occasions has this occurred? • How old were you when this occurred? If it occurred multiple times, what was your age at the time when it bothered you most?

PTSD Checklist-Civilian Version

***Instructions*:** Below is a list of problems and complaints that people sometimes have in response to stressful experiences. Please read each one carefully and circle a number to indicate how much you have been bothered by that problem in the past month.

1. Repeated, disturbing memories, thoughts, or images of a stressful experience?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

2. Repeated, disturbing dreams of a stressful experience?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

3. Suddenly acting or feeling as if a stressful experience were happening again (as if you were reliving it)?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

4. Feeling very upset when something reminded you of a stressful experience?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

5. Having physical reactions (e.g., heart pounding, trouble breathing, sweating) when something reminded you of a stressful experience?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

6. Avoiding thinking about or talking about a stressful experience or avoiding having feelings related to it?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

7. Avoiding activities or situations because they reminded you of a stressful experience?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

8. Trouble remembering important parts of a stressful experience?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

9. Loss of interest in activities that you used to enjoy?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

10. Feeling distant or cut off from other people?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

11. Feeling emotionally numb or being unable to have loving feelings for those close to you?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

12. Feeling as if your future will somehow be cut short?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

13. Trouble falling or staying asleep?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

14. Feeling irritable or having angry outbursts?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

15. Having difficulty concentrating?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

16. Being "super-alert" or watchful or on guard?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

17. Feeling jumpy or easily startled?

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

Appendix C

Examples of Emotional Picture Comparisons

Example of Rape-Positive Slides


Example of Rape-Negative Slides


Example of Positive-Negative Slides